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Final

Timber Management Environmental Impact Statement

Oregon State Office

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March 3 1849

May 1983

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BUREAU OF LAND MANAGEMENT
Salem District Office
1717 Fabry Road S.E.
P.O. Box 3227
Salem, Oregon 97302

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This is the final environmental impact statement (FEIS) on the 10-year timber management plan for the Clackamas-Molalla and Santiam River Sustained Yield Units on the east side of the Salem District. The purpose of the statement is to disclose the probable environmental impacts and to assure that these impacts are considered along with economic, technical and other factors in the decision-making process. In using this analysis, readers should keep in mind that a FEIS is not the decision document. A final decision will come later and will be announced in a record of decision.

A major issue of BLM's timber management throughout western Oregon has been concern regarding which uses of the forest land base were authorized under the terms of the O&C Act and subsequent legislation. In March 1983, following a major legal review and analysis of these authorities, BLM Director Robert Burford issued a new O&C Forest Resources Policy defining the agency position for the management of forest lands in western Oregon (see Appendix A). The proposal developed from application of the policy is identified in the statement as the new preferred alternative (Alternative 8).

Between draft and final EIS, Alternative 1 was modified in response to comments. The modifications involve exclusion of severe fragile and problem reforestation sites from the intensive timber production base and addition of a three decade departure from even flow to the allowable cut calculation.

This EIS is being released in accordance with a schedule contained in the agreement of February 19, 1976, relative to the litigation in the U.S. District Court for the District of Columbia, entitled Natural Resource Defense Council, Inc., et al. v. Thomas S. Kleppe, et al., Civil No. 75-1861. Due to the addition of a new preferred alternative (Alternative 8), a 60-day comment period on the FEIS is established. Comments received by the Salem District before August 1, 1983, will be considered prior to the release of an Eastside Salem Record of Decision.

Sincerely yours,

Joseph C Dose

Joseph C. Dose
District Manager

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FINAL

ENVIRONMENTAL IMPACT STATEMENT

EASTSIDE SALEM SUSTAINED YIELD UNITS

TEN-YEAR TIMBER MANAGEMENT PLAN

Prepared by

BUREAU OF LAND MANAGEMENT

U.S. DEPARTMENT OF THE INTERIOR

1983

William G. Leavell
State Director, Oregon State Office

EASTSIDE SALEM PROPOSED TIMBER MANAGEMENT

Draft ( ) Final (X) Environmental Impact Statement

U.S. Department of the Interior, Bureau of Land Management

1. Type of Action: Administrative (x) Legislative ( )

2. Abstract: This EIS describes and analyzes the environmental impacts of implementing an updated 10-year timber management plan for the 159,898 acres of public land in the Clackamas-Molalla and Santiam Sustained Yield Units on the east side of the Salem District, Oregon. The Bureau of Land Management is responsible for managing timber on public lands under the principle of sustained yield consistent with the protection of other resources. Nine alternatives are described and analyzed for environmental impacts. Alternative 8, the result of Bureau multiple-use planning using public input, is the preferred alternative. Other alternatives analyzed include: original proposed action, 1) maximum timber production, 2) emphasis on timber production, 3) moderate emphasis on timber production, 4) strong emphasis on non-timber values, 5) accelerated timber harvest, 6) no control of competing vegetation with herbicides and 7) no action. Specific timber management components of the alternatives include road construction, timber harvest, site preparation, reforestation, plantation protection, precommercial thinning, fertilization and control of competing vegetation. Significant environmental impacts of the new preferred alternative include wildlife habitat modification, soil productivity loss and sediment reduction.

3. Due to the addition of a new preferred alternative, a 60-day comment period on the FEIS is established. Comments will be accepted by the Salem District Manager until August 1, 1983, at the address listed below.

4. For further information contact:

Bob Saunders, Team Leader
Bureau of Land Management
Salem District Office
P. O. Box 3227
Salem, Oregon 97302
Telephone (503) 399-5634

TABLE OF CONTENTS

SUMMARY xiii

CHAPTER 1 DESCRIPTION OF ALTERNATIVES 1-1
PURPOSE OF AND NEED FOR THE ACTION 1-1
ALTERNATIVES 1-2
  The Original Proposed Action 1-6
  Alternative 1 - Maximum Timber Production 1-6
  Alternative 2 - Emphasis on Timber Production 1-7
  Alternative 3 - Moderate Emphasis on Timber Production ... 1-7
  Alternative 4 - Strong Emphasis on Non-Timber Values 1-8
  Alternative 5 - Accelerate Timber Harvest 1-8
  Alternative 6 - No Control of Competing Vegetation with Herbicides 1-9
  Alternative 7 - No Action (No Change) 1-9
  Alternative 8 - New Preferred Alternative 1-9
FOREST MANAGEMENT TREATMENTS AND DESIGN FEATURES 1-10
  Transportation System 1-11
  Timber Harvest 1-12
  Site Preparation 1-13
  Planting 1-15
  Plantation Protection 1-15
  Plantation Maintenance and Release 1-15
  Precommercial Thinning 1-16
  Fertilization 1-17
COMPARISON OF IMPACTS 1-17
IMPLEMENTATION 1-17
  Final Decisions 1-17
  Monitoring and Studies 1-20
  Requirements for Further Environmental Analysis........ 1-20
INTERRELATIONSHIPS 1-21
  Federal Government 1-21
  State and Local Governments 1-22
  Private Landowners 1-25

CHAPTER 2 AFFECTED ENVIRONMENT 2-1
TOPOGRAPHY AND GEOLOGY 2-1
CLIMATE 2-1
AIR QUALITY 2-2
SOILS 2-3
WATER RESOURCES 2-4
VEGETATION 2-9
  Terrestrial Vegetation 2-9
  Wetland and Aquatic Vegetation 2-11
  Sensitive, Threatened and Endangered Plants 2-11
ANIMALS 2-11
  Terrestrial Animals 2-11
  Fish 2-14
  Threatened and Endangered Animals 2-15

RECREATION 2-17
CULTURAL RESOURCES 2-19
  Archeological Sites 2-19
  Historic Sites 2-20
  Paleontological Sites 2-20
VISUAL RESOURCES 2-20
WILDERNESS VALUES 2-23
AREAS OF CRITICAL ENVIRONMENTAL CONCERN 2-23
SOCIOECONOMIC CONDITIONS 2-24
  Timber Industry 2-27
  Fishing 2-31
  Terrestrial Wildlife 2-33
  General Recreation 2-33
  Public Finances 2-34
  Local Income Attributable to BLM-Administered Lands 2-35
  Social Concerns 2-35

CHAPTER 3 ENVIRONMENTAL CONSEQUENCES 3-1
INTRODUCTION 3-1
IMPACTS ON AIR QUALITY 3-2
IMPACTS ON SOILS 3-2
  Conclusions 3-5
IMPACTS ON WATER RESOURCES 3-5
  Conclusions 3-9
IMPACTS ON VEGETATION 3-9
  Terrestrial Vegetation 3-9
  Wetland and Aquatic Vegetation 3-12
  Sensitive, Threatened or Endangered Plants 3-12
  Conclusions 3-13
IMPACTS ON ANIMALS 3-13
  Terrestrial Animals 3-13
  Fish 3-21
  Threatened and Endangered Animals 3-24
  Conclusions 3-25
IMPACTS ON RECREATION 3-26
  Conclusions 3-31
IMPACTS ON CULTURAL RESOURCES 3-33
  Conclusions 3-34
IMPACTS ON VISUAL RESOURCES 3-35
  Conclusions 3-38
IMPACTS ON AREAS OF CRITICAL ENVIRONMENTAL CONCERN 3-38
IMPACTS OF HERBICIDES ON HUMAN HEALTH 3-40
IMPACTS ON ENERGY USE 3-40
IMPACTS ON SOCIOECONOMIC CONDITIONS 3-43
  Short-Term Economic Impacts 3-43
  Long-Term Economic Impacts 3-47
  Other Social Impacts 3-50

CHAPTER 4 CONSULTATION AND COORDINATION ON THE DEIS 4-1

LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

LIST OF PREPARERS

APPENDICES

A O&C Forest Resources Policy Statement
B Development of Alternatives
C The Scoping Process
D Ecosystem Management
E Wildlife Species & Habitat Use
F Alteration of Wildlife Habitat
G Soils of the SYUs
H Sensitive Plant Species Currently Under Review for Possible Listing
I Primary Criteria for Determining Levels of Change in Wildlife Habitat Conditions During Next Five Decades
J Primary Criteria Used to Determine Level of Timber Management Impacts on Major Recreation Activities
K Primary Criteria Used to Determine Probable Changes in Potential ACECs
L Analysis of Alternative 5
M Estimation of Employment in Forest Management
N Economic Efficiency
O Analysis of Commercial Forest Land Allocations
P Seral Stage Distribution Concept

GLOSSARY
REFERENCES CITED
INDEX

Tables

1-1 Acres in EIS Area by County 1-2
1-2 Comparison of Alternatives by Treatment - First Decade 1-4
1-3 Derivations of Timber Production Base Acreage 1-5
1-4 Estimated 10-Year Use of Herbicides Based on New Preferred Alternative Acreage 1-14
1-5 Summary of Impacts 1-18
1-6 Relationship of Eastside Salem Alternatives to LCDC Statewide Goals 1-24
1-7 Consistency of the Alternatives with the Basic Objectives of the Forestry Program for Oregon 1-26
1-8 Consistency of the Alternatives with State of Oregon Wildlife Goals 1-27

2-1 Air Quality 2-2
2-2 Fragile Areas Within SYUs 2-3
2-3 Municipal Watersheds 2-6
2-4 Existing Forest Vegetation Stratification of Western Cascades 2-10
2-5 Habitat Structure of Forest Lands in the Western Cascades 2-12
2-6 Amount, Condition and Trend of BLM-Administered Habitat 2-13
2-7 Cold Water Fish Habitat and Populations 2-15
2-8 Habitat Conditions at Northern Spotted Owl Locations 2-16
2-9 Estimated Recreation Visitor Days 2-17

2-10 Rivers Identified in the Nationwide Rivers Inventory 2-19
2-11 Nominated and Potential Areas of Critical Environmental Concern 2-25
2-12 Population, 1960-1980 2-24
2-13 Personal Income and Labor and Proprietors' Income, 1975-79 2-26
2-14 Average Covered Employment, 1976-80 2-27
2-15 Earnings and Employment Generated by the Timber Industry 2-29
2-16 Employment and Earnings Generated by BLM Timber Harvest 2-30
2-17 Local Income and Employment Generated by Commercial Fishing and the Trip Expenditures of Sport Anglers, 1975 2-31
2-18 Local Income and Employment Generated by Hunting and General Recreation Activity, 1975 2-33
2-19 O&C Revenue Distribution to Counties Expressed as Property Tax Rate Equivalent and as Percent Supplement to Local Levy, Fiscal Years 1977-1980 2-34
2-20 Changes Desired by Survey Respondents in the Use of Federal Lands 2-36

3-1 Estimated Acres Lost from Production During First Decade 3-3
3-2 Estimated Annual Water Yield from BLM-Administered Land, End of First Decade 3-6
3-3 Estimated Annual Sediment Yield from BLM-Administered Land, End of First Decade 3-7
3-4 BLM-Administered Lands in Municipal Watersheds Proposed for Harvest in the Sample 5-Year Timber Sale Plan 3-9
3-5 Probable Changes in Wildlife Habitat Conditions on BLM-Administered Lands During Next Five Decades 3-14
3-6 Probable Changes in Selected Wildlife Populations During Next Five Decades 3-16
3-7 Probable Changes in Fish Habitat Conditions During Next Five Decades 3-22
3-8 Probable Changes in Cold Water Fish Populations During Next Five Decades 3-24
3-9 Number of Spotted Owl Locations Protected Based on Previous and Proposed Revised Recommendations 3-25
3-10 Probable Changes in Recreation Activities and Opportunities During Next Five Decades 3-27
3-11 Estimated Recreation Visitation (1990) 3-30
3-12 Potential Impacts of the Sample 5-Year Timber Sale Plan on Recreation 3-32
3-13 Probable Long-Term Changes in Cultural Resource Conditions 3-33
3-14 Probable Long-Term Changes in Visual Resource Conditions 3-36
3-15 Probable Changes in Visual Resource Conditions Under the Sample 5-Year Timber Sale Plan 3-37
3-16 Probable Changes in Potential ACECs During Next Five Decades ... 3-39
3-17 Herbicide Toxicity 3-41
3-18 Estimated Annual Energy Consumption Attributable to the Alternatives 3-42
3-19 Short-Term Impacts Compared to Existing Condition on Local Employment and Earnings Related to Timber Harvest 3-44
3-20 Short-Term Impacts Compared to No Action Condition on Local Employment and Earnings Related to Timber Harvest 3-45

3-21 Short-Term Impacts Compared to No Action Condition on Local Income and Employment Related to Fishing, Hunting and Other Recreation 3-46
3-22 Summary of Impacts on Income and Employment 3-47
3-23 Distribution of O&C Payments from SYUs to Counties 3-48
3-24 Short-Term Impacts of O&C Payments on Local Government Finances 3-49

Figures

Vicinity Map xii
1-1 Eastside Salem SYUs - EIS Area .... Inside Back Pocket

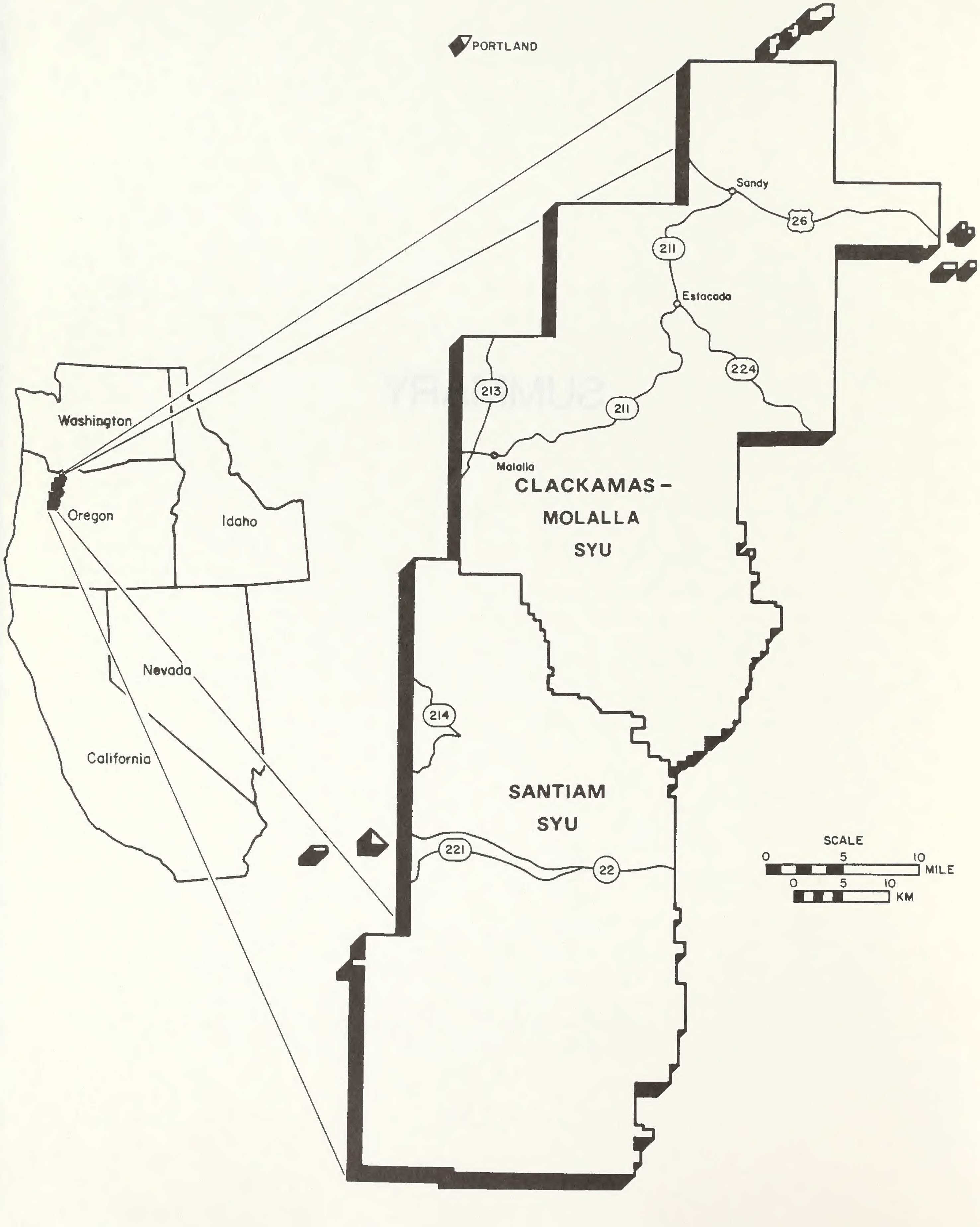
2-1 Soils 2-5
2-2 Drainages 2-7
2-3 Visual Resource Management Classes 2-21
2-4 Comparison of Trends in Unemployment and Timber Employment 2-28
2-5 Timber Sales and Harvests 2-32

3-1 Clearcutting and Thinning by Decade: New Preferred Alternative ... 3-18

SUMMARY

VICINITY MAP

EASTSIDE SALEM SYUS



SUMMARY

Introduction

This environmental impact statement (EIS) describes and analyzes the environmental impacts of implementing an updated 10-year timber management plan for the Clackamas-Molalla and Santiam Sustained Yield Units in the Salem District, Oregon. Hereafter, the Sustained Yield Units will be referred to as Eastside Salem Sustained Yield Units or simply the SYUs. This EIS applies to actions proposed for the 159,898 BLM-administered acres within the combined SYUs. These are primarily revested Oregon and California Railroad lands.

In accordance with the National Environmental Policy Act, this EIS identifies impacts on the natural and human environment associated with the alternatives. The EIS analysis is based primarily on data collected and analyzed through the Bureau planning system which included extensive public involvement. A preferred land use alternative, selected during the planning process, provides the basis for the EIS original proposed action. The original proposed action was modified between draft and final EIS to produce the new preferred alternative. A total of nine alternatives have been identified, providing a wide range of options for review and consideration.

Alternatives

Timber harvest under all alternatives would be accomplished predominately by clearcutting, with some single tree selection. Intensive timber management treatments would include construction of logging roads, brush field and hardwood stand conversion, site preparation with burning, mechanical means and herbicide application (except Alternative 6), planting coniferous trees (including genetically improved stock), animal damage control, plantation maintenance and release with herbicides or manual means, precommercial thinning and fertilization. All of these treatments except for herbicide application would be used under Alternative 6.

Variables among alternatives include amounts of land allocated to timber production, types and amounts of intensive management practices, harvest scheduling and constraints on timber harvest to benefit other resource values. The alternatives are:

Original Proposed Action. This alternative would result in an average annual timber harvest of 90.9 million board feet (MM bd. ft.). Protection of riparian zones to benefit water quality, fish and wildlife would be provided. Designated areas would be managed to produce and maintain large and small blocks of old-growth and mature forest habitat. These areas would be distributed in corridors. Partial protection of special wildlife habitat is also included in this alternative. Areas with highly scenic, recreational and critical environmental values would be protected through preservation or special management techniques.

1. Maximum Timber Production. This alternative is designed to allow a three decade departure from an even-flow harvest level. This departure would produce annual harvests of 121.2 MM bd. ft. in the first decade, 107.9 MM bd. ft. in the second and third decades and 108.9 M bd ft. in the fourth decade and beyond. Except for sensitive plant habitat, existing recreation sites, progeny test sites and Timber Production Capability Classification (TPCC) withdrawals, all commercial forest land would be allocated to intensive timber production. This alternative would provide streamside buffers consistent with the Oregon Forest Practices Act; however, protection for riparian zones, scenic areas, natural areas, most mature and old-growth forest and similar resource values would not be provided.

2. Emphasis on Timber Production. This alternative represents perpetuation of current management constraints with the addition of more intensive application of forest management treatments. An average annual timber harvest of 93.1 MM bd. ft. could be sustained. Non-timber provisions include retention of old-growth and mature forest in spotted owl management areas and some protection of riparian zones, visual resources, recreation sites and natural areas by avoiding and/or constraining on-site timber management activities. Use of formal protective designations, such as Research Natural Area, would be minimal.

3. Moderate Emphasis on Timber Production. Average annual harvest under this alternative would be 91.9 MM bd. ft. Allocations for riparian zone and recreation site protection would be similar to Alternative 2. Major differences from Alternative 2 would be greater protection of Areas of Critical Environmental Concern (ACECs) and allocation of more acres for old-growth and mature forest wildlife habitat, visual resources and designated Research Natural Areas.

4. Strong Emphasis on Wildlife and Other Non-Timber Values. Under this alternative, average annual timber harvest would be 64.2 MM bd. ft. A full ecosystem approach would be used to provide wildlife habitat diversity. Designated areas would be managed to produce and maintain large and small blocks of old-growth and mature forest habitat. These areas would be distributed over the entire SYUs rather than confined to corridors as in the original proposed action. Other high value, non-timber resources would be protected through preservation and formal protective designations.

5. Accelerate Timber Harvest. This alternative uses the same land allocations as the original proposed action but increases the average annual harvest by departing from even-flow harvest levels for three decades in one SYU and by lowering the minimum age for final harvest in the other SYU. These modifications would produce annual harvests of 99.1 MM bd. ft. in the first decade, 92.0 MM bd. ft. in decades two and three and 93.0 MM bd. ft. in decade four and beyond.

6. No Control of Competing Vegetation with Herbicides. This alternative is the same as the original proposed action except that herbicides would not be used to control grass, brush and hardwood species growing in competition with commercial conifers. Control of vegetation for timber management by burning, grazing or using mechanical or manual means would be prescribed to the same dollar level of investment as used for herbicides in the original proposed action. This would result in an average annual timber harvest of 85.8 MM bd. ft.

7. No Action (No Change). This alternative constitutes a continuation of the present allowable cut (86.1 MM bd. ft.). Continuation of the same management practices and constraints used in the 1972 allowable cut calculation is assumed. Minimal protection would be provided for developed recreation sites, wildlife habitat and the most sensitive scenic areas.

8. New Preferred Alternative. This alternative would provide an annual average harvest of 93.3 MM bd. ft. Protection of riparian zones, special wildlife habitats and areas with critical environmental values would be the same as under the original proposed action. Blocks of old-growth and mature forest, distributed in corridors, would be protected for the decade to benefit wildlife and safeguard long-term timber production. Most highly scenic and/or visually sensitive areas would be harvested at a rate of 10 percent per decade. Existing developed recreation sites would be retained, but no areas would be designated as Recreation Lands (see Glossary).

Environmental Consequences

Air Quality

Slash burning for the decade ranges from 7,707 acres under Alternative 4 to 15,768 acres under Alternative 1. Air quality in nearby residential areas could be impacted by relatively brief smoke intrusions under any alternative. Past experience indicates that smoke intrusions in residential areas are not likely to occur from BLM slash fires in the SYUs during the decade.

Soils

Road construction, yarding, slash burning and brush scarification can create soil compaction, soil disturbance, soil loss and mass failures. The severity of any impact is closely related to fragility of soils and amount of area disturbed. Where soils are highly impacted, vegetation productivity would decline. Equivalent acres lost from production (by compaction and topsoil removal, dry ravelling, debris avalanches and debris torrents) are expected to range from 1,748 under Alternative 1 to 1,158 under Alternative 4.

Water Resources

Road building and soil compaction from logging would locally increase runoff and streamflows. However, as a whole, water yield increases would be negligible in the SYUs.

Cumulative sediments produced as a result of activities under all alternatives except 1 would be expected to decrease from existing levels. Sediment yield for Alternative 1 would increase 3.7 percent above existing levels. Sediment yield would decrease as much as 10.2 percent below existing levels under Alternative 4. The amount of sediment produced would depend on factors such as proximity of disturbance to waterways, streamside buffer widths, percent slope, climatic events and soil erodibility.

Vegetation

Alterations to plant community structure and longevity would be the most significant impacts to vegetation on lands scheduled for timber harvest. Acres scheduled for timber harvest would range from 10,822 under Alternative 4 to 20,865 under Alternative 1. Mature and old-growth forest communities would be converted to early successional stage communities as slow-growing timber stands are replaced by young, fast-growing stands. Diversity and complexity of plant communities would diminish as maximum growth of commercial conifers is emphasized. Changes in plant communities and habitat could eliminate some plant species. Permanent road construction during the decade would eliminate some vegetation from public land, ranging from 685 acres under Alternative 4 to 828 acres under Alternative 1.

Animals

Of all alternatives, Alternative 1 would most impact habitat diversity by reducing amounts of old growth and mature forest from 38,239 acres to 30,199 acres (decade 1). Alternative 4 would have the least impact, retaining 35,295 acres of old growth and mature forest. Habitat removed by road construction would be permanently and irretrievably lost for roads constructed as part of the permanent road system.

Under most alternatives, cold water fish habitat is expected to continue improving except where design features (e.g., relating to roads, bridges, culverts) fail. If Alternative 1 were selected, impacts to fisheries would be adverse.

Increases in water yield could have an adverse impact on fish in small watersheds, but impacts would be negligible to the fishery resource in the SYUs as a whole. Short-term, localized increases in water temperature would be expected under all alternatives. Adverse impacts resulting from temperature changes would be greatest under Alternatives 1 and 7.

The spotted owl is listed by the State of Oregon as a threatened species. All alternatives would reduce the number of existing spotted owl locations in the SYUs. During the first decade, protected spotted owl locations would range from 10 under the original proposed action and Alternatives 3, 5 and 6 to 0 under Alternative 1 (based on an assumption that 300+900 acres/location is adequate protection).

Recreation

Depending on the recreation experience desired, impacts from timber management would be both beneficial and adverse. The greatest adverse impacts on recreation would occur under Alternative 1, which would minimally provide for future needs and would severely degrade the recreation experiences desired by most visitors. Alternative 4 would most benefit recreation, since dispersed and developed recreation needs would be fully accommodated. Under the original proposed action and Alternatives 3, 5, 6 and 8, many future needs would be accommodated, but adverse impacts would still occur. Some needs for developed recreation sites would not be accommodated, some established buffers and trails would be impacted, and a few higher quality recreation use areas would be only partially protected. Alternatives 2 and 7 would accommodate fewer future recreation needs.

Cultural Resources

Appropriate measures would be taken to identify and protect cultural sites prior to ground-disturbing activities under all alternatives. Undiscovered cultural sites would be susceptible to considerable alteration and damage. Once a site is found, however, measures would be taken to minimize or avoid damage.

Under all alternatives except 1 and 7, known sites and sites discovered before logging would be managed to protect scientific and/or interpretive values. Under Alternatives 1 and 7, only sites (except Table Rock Trail) on or eligible for the National Register of Historic Places would be protected from ground disturbance. (Table Rock Trail would be subject to impact at one point by a road crossing.) Appropriate measures utilizing known strategies for data recovery would be developed for all other cultural sites; however, some loss of information may result from not protecting sites until new methods for recovery and analysis are formulated.

Visual Resources

Alternative 4 provides the highest degree of protection for visual resources. Adverse visual impacts under Alternative 3 would be low, with most highly scenic and/or sensitive areas protected. Under the original proposed action and Alternatives 5, 6 and 8, adverse visual impacts would be moderate, and some protection would be provided for certain highly scenic and/or sensitive areas. Adverse visual impacts would be greatest under Alternatives 1, 2 and 7.

Areas of Critical Environmental Concern (ACEC)

The seven areas identified as potential ACECs would not be impacted by timber management under Alternative 4. The original proposed action and Alternatives 3, 5, 6 and 8 would allow restricted timber management in buffer zones of several potential ACECs, but primary zones would be protected. Some primary zones would be indirectly impacted under Alternatives 2 and 7. All potential ACECs would be subject to timber management and loss of critical values under Alternative 1.

Human Health

The possiblility of human health being impacted by the use of herbicides is related to the toxicity of the herbicides, the likelihood of exposure, and resulting dosage received. Based on current knowledge and the low risk of exposure on BLM-treated acres, an unreasonable risk to human health from continued, careful use of herbicides is unlikely. Herbicides would not be used under Alternative 6.

Energy Use

Fossil fuel energy would be consumed in all phases of the 10-year timber management plan. The annual energy consumption would range from .331 trillion British thermal units (Btu's) under Alternative 4 to .599 trillion Btu's under Alternative 1.

Socioeconomics

Compared to recent economic conditions (existing condition), all alternatives except 4 would increase employment in the timber industry and total local employment and earnings. Alternative 1 would cause the largest increases of 1,201 jobs and $16.3 million in earnings. Alternative 4 would cause the loss of 698 jobs and $9.4 million in earnings. Public revenues would be increased under all alternatives except 4.

Compared to a continuation of the current timber management program (no action), all alternatives except 4 would have a favorable impact on total employment and earnings. The largest increases would occur under Alternative 1 with net increases of 1,029 jobs and $13.9 million in earnings. Alternative 4 would result in the loss of 848 jobs and $11.5 million in earnings. Public revenues would be increased under all alternatives except 4 and 6.

CHAPTER 1

DESCRIPTION OF ALTERNATIVES

CHAPTER 1 DESCRIPTION OF ALTERNATIVES

PURPOSE OF AND NEED FOR THE ACTION

The Bureau of Land Management (BLM) proposes to implement, beginning October 1, 1984, an updated 10-year timber management plan for the Clackamas-Molalla and Santiam Sustained Yield Units (see Glossary) in the Salem District, Oregon (see Figure 1-1, folded maps in back cover pocket). Hereafter, the Sustained Yield Units will generally be referred to as the Eastside Salem SYUs or simply the SYUs. In accordance with the National Environmental Policy Act (NEPA), this Environmental Impact Statement (EIS) identifies impacts on the natural and human environment associated with nine alternatives. The 10-year timber management plan for the SYUs will provide direction for management of BLM-administered land, as required by the actions described in this chapter.

The major BLM-administered holdings in the SYUs are revested Oregon and California Railroad lands (O&C lands). The Bureau's principal authority and direction to manage the O&C lands is found in the O&C Act of August 28, 1937 (50 stat. 874; 43 U.S.C. 1181a., et seq.). Under this Act, O&C lands classified as timberlands are to be managed under sustained yield principles in order to provide a permanent source of timber supply, watershed protection, streamflow regulation and recreation facilities. Most of the remaining BLM-administered land is intermingled public domain, which was brought under sustained yield management principles by the Bureau's 1969 application to withdraw these lands from entry under all public land laws except certain disposal acts. Withdrawal was completed by Public Land Order 5490 (40 FR 7450 (1975)). In addition, many activities of the BLM are governed by the Federal Land Policy and Management Act of 1976 (90 Stat. 2743, 43 U.S.C. 1701). This law, often referred to as FLPMA, established policy for BLM administration of public lands under its jurisdiction.

Notwithstanding any provision of FLPMA, in the event of conflict with or inconsistency between FLPMA and the O&C Act, insofar as it relates to management of timber resources and disposition of revenues from lands and resources, the 1937 act shall prevail.

The O&C Forest Resources Policy to be used in formulating decisions for BLM-administered forest lands in western Oregon was approved by the Director in March 1983. A copy of the policy is included in this EIS in Appendix A. To respond to the policy, an additional alternative has been included in this FEIS and is designated BLM's new preferred alternative (Alternative 8).

The 10-year timber management plan will be based upon a comprehensive land use plan for the SYUs prepared by Salem District personnel. Comprehensive planning covers 159,898 acres administered by BLM. These lands are widely dispersed over portions of Clackamas, Linn, Marion and Multnomah Counties, an aggregate area of 3,726,000 acres (Table 1-1).

Appendix B presents a discussion of the inventory methods and planning process used to arrive at the timber production base (see Glossary), allowable cut determination and other land use allocations.

Table 1-1 Acres in EIS Area1/, by County

County	O&C2/	PD3/	Other BLM4/	Total BLM	Total County
Clackamas	49,990	13,158	80	63,228	1,211,520
Linn	68,501	2,724	7	71,232	1,470,000
Marion	20,786	219	64	21,069	752,000
Multnomah	3,421	948	--	4,369	292,480
Total	142,698	17,049	151	159,898	3,726,000

1/ Acreage figures for BLM-administered lands are derived from master title plats. Total acreage figures are from Resource Atlases published by Oregon State University Extension Service, 1964.

2/ Oregon & California Railroad Lands.

3/ Public Domain Lands.

4/ Railroad Grant and Acquired Lands.

During an EIS scoping meeting held in Salem, Oregon (July 14, 1981), participants were asked to identify issues and alternatives to be addressed in this EIS. The following section includes alternatives identified during scoping and considered appropriate for full analysis. Alternatives identified but not considered appropriate for full analysis, and the rationale for these determinations, are presented in Appendix C, which summarizes the scoping meeting.

The alternative land use plans prepared for the SYUs identify various timber harvest levels, management practices and mitigating measures to protect the land and other resources. This information is described in detail in the remainder of this document.

ALTERNATIVES

There are nine alternatives including the original proposed action and a new preferred alternative for which impacts will be analyzed in Chapter 3:

Original Proposed Action (OPA)
1. Maximum Timber Production (Max. Tbr.)
2. Emphasis on Timber Production (Emp. Tbr.)
3. Moderate Emphasis on Timber Production (Mod. Tbr.)
4. Strong Emphasis on Non-Timber Values (Emp. Other)
5. Accelerate Timber Harvest (Acc. Tbr.)
6. No Control of Competing Vegetation with Herbicides (No Herb.)
7. No Action (No Change)
8. New Preferred Alternative (NPA)

For each alternative, sustained yield harvest levels (allowable cuts) have been calculated using the timber production bases of the two SYUs. For convenience, the two cut estimates are combined in this EIS. All allowable cut computations are made in cubic feet and converted to Scribner (see Glossary) board feet equivalence for the first decade. Variables between alternatives include amount of land allocated to timber production, types and amounts of intensive management practices, and constraints on timber harvest to accommodate other resource values. These variables are displayed in Table 1-2. Forest management treatments and design features applicable to each alternative are discussed in the next section of this chapter.

Under the original proposed action and Alternatives 2, 3, 4, 6 and 8, the youngest trees available for future final harvest in the intensive timber production base would be 60 years of age. Timber of this age would be harvested during the 10th through 40th decades in the Clackamas-Molalla SYU and the 5th through 12th decades in the Santiam SYU. The average size of this timber would be 15 inches diameter at breast height (dbh). When the forest approaches a regulated condition (see Glossary), the average diameter of timber proposed for final harvest for the combined SYUs would be 17 inches dbh, normally reached in 70 years. As discussed below, the average diameter of timber proposed for final harvest before regulation would differ from 15 inches dbh under Alternatives 1, 5 and 7.

In areas allocated to constrained timber production, harvest limitations would be used to achieve recommended goals for wildlife habitat diversity, visual resource management (VRM), recreation lands (see Glossary) and Areas of Critical Environmental Concern (ACEC) (see Glossary). On lands in the wildlife constrained timber bases, the intent would be to maintain specific acreages in timber at or above 200 years old and/or 350 years old at any one time during the projection period. No harvesting would be undertaken until minimum acreages were achieved.

Protection of visual and recreation values and potential ACECs would be accommodated by placing limitations on the number of acres harvested from constrained bases during each decade.

The harvest level shown in Table 1-2 for each alternative is a composite of the individual intensive and constrained timber production bases. Table 1-3 displays the breakdown by category and alternative.

Table 1-2 Comparison of Alternatives by Treatment - First Decade

	Original Proposed Action (OPA)	Alt. 1 Max. Tbr	Alt. 2 Emp. Tbr.	Alt. 3 Mod. Tbr.	Alt. 4 Emp. Other	Alt. 5 Acc. Tbr.	Alt. 6 No Herb.	Alt. 7 No Action	Alt. 8 NPA
Intensive Timber Production Base[1]	102,901	129,808	102,288	108,944	70,099	102,901	102,901	120,329	107,345
Constrained Timber Production Base[1]	18,696	0	20,805	7,520	43,480	18,696	18,696	9,879	7,696
Annual Harvest									
Million bd.ft.	90.9	121.2	93.1	91.9	64.2	99.1	85.8	86.1	93.3
Million cu.ft.	14.27	19.07	14.61	14.42	10.08	15.56	13.47	13.52	14.64
Treatments[2]									
Transportation System (miles;acres)									
New Construction[3]	96;771	104;828	97;776	93;743	86;685	96;771	96;771	101;805	91;729
Reconstruction	50;0	50;0	50;0	50;0	50;0	50;0	50;0	50;0	50;0
Timber Harvest (acres)									
Clearcut	12,880	17,743	13,424	13,080	9,027	14,118	12,333	13,115	13,190
Shelterwood	674	0	0	389	311	674	674	0[7]	701
Mortality Salvage	1,065	1,322	562	1,063	637	1,065	1,065	1,844	1,113
Commercial Thinning	1,488	1,800	1,208	1,682	847	1,488	1,488	1,842	1,691
Site Preparation (acres) [4]									
Broadcast Burning (slash disposal)	11,343	15,768	11,835	11,493	7,707	12,480	9,828	10,464	10,050
Herbicide	5,050	6,900	5,250	5,000	3,300	5,500	0	3,950	2,400
Manual	367	483	399	373	205	391	2,041	234	1,100
Mechanical	3,578	4,929	3,765	3,662	2,513	3,910	3,454	3,237	4,500
Planting (acres)									
Initial Plant[5]	12,544	17,391	13,124	12,716	8,438	13,782	11,997	12,310	12,896
Replant or Interplant	6,900	9,565	7,218	6,994	4,641	7,580	6,598	6,771	7,093
Plantation Protection (acres)	4,362	5,999	4,602	4,402	2,825	4,761	4,212	1,864	4,603
Plantation Maintenance and Release[6] (acres)	5,553	7,777	5,781	5,667	3,835	6,109	2,199	5,446	6,200
Precommercial Thinning (acres)	11,162	13,200	11,623	12,599	8,243	11,162	11,162	13,079	9,350
Fertilization (acres)	7,984	9,018	8,064	8,702	6,418	7,984	7,984	0[7]	7,276

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[1] See Glossary.

[2] Each treatment is described in detail following descriptions of the alternatives.

[3] Figured at the rate of 8 acres/mile of road, including landings.

[4] Includes stand conversion (brush and hardwood) acres: under the OPA and Alts. 5, 6 and 8 - 435 acres; Alts. 1 and 2 - 476 acres; Alt. 3 - 379 acres; Alt. 4 - 96 acres; and Alt. 7 - 0 acres.

[5] Includes acres to be planted with genetically-improved seedlings: under the OPA - 10,049 acres; Alt. 1 - 13,086 acres; Alt. 2 - 10,255 acres; Alt. 3 - 10,178 acres; Alt. 4 - 6,888 acres; Alt. 5 - 11,004 acres; Alt. 6 - 9,618 acres; Alt. 7 - 9,584 acres; and Alt. 8 - 10,319 acres.

[6] Both manual and chemical methods would be used under all alternatives except Alternative 6 where manual methods would be employed exclusively.

[7] Treatments not identified in 1972 Allowable Cut Plan.

Table 1-3 Derivations of Timber Production Base Acreage

	Alternatives (Acres)						
	OPA, 5&6	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 71/	Alt. 8
No Planned Timber Harvest							
Non-forest Lands	11,695	11,695	11,695	11,695	11,695	8,920	11,695
Fragile Site Withdrawals2/	10,958	10,958	10,958	10,958	10,958	8,863	10,958
Reforestation Withdrawals	953	916	916	953	1,051	0	953
MFP Withdrawals	9,100	889	7,604	14,233	17,118	7,721	15,656
VRM	1,179	0	1,421	2,360	4,320	2,983	0
Recreation Sites/Lands	1,454	734	793	200	8,000	3,599	500
Riparian Zones	5,520	0	3,277	3,193	3,638	1,139	5,514
Mid-age and Old-growth Forest	0	0	1,500	7,880	0	0	8,677
Misc. (ACEC, Cultural, etc.)	947	155	613	600	1,160	0	965
Hardwood Lands	5,035	5,031	5,031	5,091	5,276	4,013	5,035
Scattered Tracts	125	125	125	125	125	173	125
Sub-total (No Planned Harvest)	37,866	29,614	36,329	43,055	46,223	29,690	44,422
Planned Timber Harvest							
Intensive Base	102,901	129,808	102,288	108,944	70,099	120,329	107,345
Constrained Base	18,696	0	20,805	7,520	43,480	9,879	7,696
ACEC	3,585	0	0	0	0	0	3,585
VRM	3,348	0	12,066	7,520	6,400	1,517	4,111
Mid-age Forest (MHA3/-200)	11,763	0	0	0	20,040	0	0
Old-growth Forest (MHA-350)	0	0	0	0	17,040	0	0
Riparian Zones	0	0	5,657	0	0	7,510	0
Municipal Watersheds	0	0	2,835	0	0	0	0
Recreation/Education Areas	0	0	247	0	0	852	0
Other4/							
Stand Conversion	435	476	476	379	96	0	435
Sub-total (Planned Harvest)	122,032	130,284	123,569	116,843	113,675	130,208	115,476
Total SYUs Acres	159,898	159,898	159,898	159,898	159,898	159,898	159,898

1/ Land use allocations for this alternative (7) result from land classification and inventory programs used in the 1970 planning process.

2/ See Glossary (Withdrawals).

3/ Minimum harvest age.

4/ Unmerchantable hardwoods and brush fields that are included in the allowable cut computation after conversion to conifer plantations.

Original Proposed Action

The original proposed action would provide an average annual harvest of 90.9 million board feet (MM bd. ft.). A time lag of 5 to 7 years before harvest of adjacent clearcut units would be applied when possible.

Riparian zones (see Glossary) on all third order and larger streams and all second order streams with fish and municipal water diversions would be protected by limiting disturbances to road and yarding corridors. The width of these zones would be the actual riparian area as determined by on-site observation. Wildlife habitat diversity would be retained in ecosystem management corridors, encompassing forest lands of all ages up to 350 years (see Appendix D). Within the corridors, large and small blocks of old-growth coniferous forest and replacement stands would be maintained by appropriate timber harvesting cycles. These blocks are included in the constrained timber production base (MHA-350 in Table 1-3). However, no timber harvest would be scheduled within designated blocks until wildlife habitat management plans were developed. On the remainder of the land base, wildlife values associated with unique and special habitats (meadows, cliffs, wetlands, etc.), snags and hardwoods would be given full or partial protection, as dictated by individual management situations.

All public lands would be managed in accordance with objectives to mitigate or, in some cases, avoid impacts of management activities on scenic values. Most highly scenic and/or sensitive areas would be preserved (unharvested) or timber would be harvested at 10 percent removal per decade. Potential ACECs would be protected from actions which could significantly affect critical resource values. Parts of some potential ACECs would be harvested under special constraints (10 percent removal per decade). Some additional areas and facilities would be provided to partially meet projected recreation needs (Table 3-11). One area would be designated and managed as Recreation Lands (see Glossary).

Alternative 1 - Maximum Timber Production

In the Clackamas-Molalla SYU, a departure from the even-flow (see Glossary) harvest level would occur in the first three decades. No departure would occur in the Santiam SYU. This increase would result in annual harvests of 121.2 MM bd. ft. in the first decade, 107.9 MM bd. ft. in the second and third decades and 108.9 MM bd. ft. (the even-flow level) in the fourth decade and beyond. The youngest timber proposed for final harvest would be in the 50-year age class (decades 8-39) in the Santiam SYU and the 60-year age class (decades 10-40) in the Clackamas-Molalla SYU. The average diameter of trees in these stands would be 13 inches and 15 inches dbh, respectively.

Except for sensitive plant species (see Glossary) habitat, existing recreation sites, progeny test sites, and Timber Production Capability Classification (TPCC) withdrawals, all commercial forest land would be allocated to the intensive timber production base (Table 1-3). This alternative would provide streamside buffer strips (see Glossary) consistent with the Oregon Forest Practices Act. In order to maximize timber production, protection and/or enhancement of wetlands, riparian zones, scenic areas, natural areas, most other non-commodity resource values and most old-growth and mature forest would not be provided.

Alternative 2 - Emphasis on Timber Production Consistent with Enhancement of Some Other Values

This alternative represents a continuation of the current management program, except that a higher timber yield per acre is expected due to more intensive application of forest management treatments (see Chapter 2, Vegetation). An average annual harvest of 93.1 MM bd. ft. could be sustained.

Under this alternative, protection would be provided for non-timber resource values by withdrawing some lands from the timber production base and placing others in long rotation cycles (up to 240 years). This approach would result in harvest of approximately 6 percent of the acres per decade in the long rotation cycles.

Protection of wetland areas and riparian zones on streams with major anadromous fish runs and/or municipal water diversions would be similar to that of the original proposed action except that commercial trees could be harvested. Other streams would generally receive less protection. Protection of old-growth forest as wildlife habitat would be limited to areas where seven northern spotted owl locations have been identified.

No areas would be managed to protect their potential for designation as Recreation Lands. However, other allocations would protect most primary recreation features throughout the SYUs. Opportunities to develop new recreation sites would be provided to partially meet projected needs. Highly scenic and/or sensitive viewing areas and one Research Natural Area would be protected.

Alternative 3 - Moderate Emphasis on Timber Production Combined with Preservation of Old-Growth Habitat and Enhancement of Other Non-Timber Values

Average annual timber harvest under this alternative would be 91.9 MM bd. ft. Most timber management features are the same as the original proposed action. Alternative 3 differs in that more acres are available for intensive timber management.

Wetlands and riparian zones on all third order and larger streams would be protected by limiting disturbances to road and yarding corridors. The width of these zones would be the actual riparian area as determined by on-site observation. The wildlife habitat component would focus on retention (no harvest) of some old-growth forest. Recreation and natural area management would be similar to the original proposed action with the exception of less intensive timber harvest in buffer zones and fewer areas managed to protect their potential for special designations. Compared to the original proposed action, fewer acres would be allocated to preserve visual resources. More acres would be allocated to retention of visual resources, i.e., some timber harvest would be limited to 5 percent removal per decade.

Alternative 4 - Strong Emphasis on Enhancement of Wildlife and Other Non-Timber Values

Under this alternative, a full ecosystem management approach would be used to achieve wildlife habitat diversity (see Appendix D). This approach differs from the original proposed action in two ways: (1) large and small blocks of old-growth and mature forest wildlife habitat would be distributed throughout the SYUs; and (2) a 200-year harvest cycle would be added to assure the retention of mature (116-195 years) forest stands. Unique and special wildlife habitats would be given full protection.

Other resource management provisions include enhancement and protection of wetlands, visual resources, potential ACECs, and special recreation management areas. Riparian zones ranging from 50 feet on each side of second order streams to 150 feet on each side of seventh order streams would also be protected. To meet future recreation needs, moderate to high quality areas would be managed to protect their potential for development as new recreation sites and trails.

An average annual harvest of 64.2 MM bd. ft. could be sustained on intensive and constrained land bases. The constrained base, which is intended for visual resources retention, would be harvested at the rate of 5 percent per decade.

Alternative 5 - Accelerate Timber Harvest from Original Proposed Action Timber Management Base

This alternative consists of the same land use allocation and level of intensive management as the original proposed action. There are two major differences. First, the youngest age classes scheduled for final harvest in the Santiam SYU would be 50 years in decades 6, 7, 8 and 10-32, and 40 years in decade 9. This younger timber would have average diameters of 13 inches and 11 inches, respectively. Secondly, in the Clackamas-Molalla SYU a departure exceeding even flow (see Glossary) would occur in the first decade. This increase, which exceeds the sustained yield capacity for the intensive timber management base, would result in annual harvests of 99.1 MM bd. ft. during the first decade, 92.0 MM bd. ft. for decades 2 and 3 and 93.0 MM bd. ft. (the even flow level) for decade 4 and beyond. A regulated forest on the intensive timber production base would be reached around the 40th decade in the Santiam SYU as compared to the 14th decade under the original proposed action. In the Clackamas-Molalla SYU, the increase in harvest would not affect the time required to achieve regulation.

The maximum long-term sustained harvest level that could be achieved under either alternative is estimated to be 99.9 MM bd. ft. annually. Since this harvest level is dependent upon a regulated forest, the sooner regulation is achieved, the sooner this volume would be available. See Appendix L for additional details regarding Alternative 5.

Alternative 6 - No Control of Competing Vegetation with Herbicides

This alternative is the same as the original proposed action in timber base and treatments, except that herbicides would not be used to control grass, brush and hardwoods growing in competition with commercial conifers. This would eliminate herbicide treatments for the control of competing vegetation prior to reforestation (site preparation), during establishment (plantation maintenance) and after young stands become established (release). Control of vegetation for timber management by biological, mechanical or manual methods would be prescribed to approximately the same dollar level of investment as used for herbicides in the original proposed action to provide a means of direct comparison between the two alternatives. The average annual timber harvest under this alternative would be 85.8 MM bd. ft.

Continuation of the "no herbicides" alternative beyond the first decade would be expected to result in a reduction in future timber productivity. When the forest reaches regulation under the original proposed action (8th decade in the Clackamas-Molalla SYU and 14th decade in the Santiam SYU), productivity would be approximately 13 percent less than would be realized from continuation of the original proposed action.

The difference in timber production between this alternative and the original proposed action could possibly be narrowed by greater investments in manual and mechanical methods. However, the cost effectiveness of continued manual and mechanical treatments on a given site is questionable. Levels of investment will be addressed in the decision document prepared after the final EIS.

Alternative 7 - No Action (No Change)

This alternative constitutes a continuation of the present allowable cut (86.1 MM bd. ft. per year). In the Santiam SYU, the minimum age class available for final harvest in decades 8-24 would be 70 years. In the Clackamas-Molalla SYU, 80 years would be the minimum age class available for final harvest through the 40-decade projection period. This younger timber would have average diameters of 17 inches and 19 inches, respectively. Continuation of the same management practices and constraints used in the 1972 allowable cut calculation is assumed.

Protection would be provided for recreation sites, fragile areas and some highly scenic areas. Other land use allocations (Table 1-3) and management treatments (Table 1-2) proposed under this alternative are those planned for the second decade of the 1972 timber management plan.

Alternative 8 - New Preferred Alternative

This new alternative was developed between draft and final EIS in response to public comment, economic considerations and policy review. It is very similar to the original proposed action. Protection of visual, recreation and wildlife values would receive less emphasis, although the major objectives of these programs would still be met.

This alternative would provide an annual harvest of 93.3 MM bd. ft. A time lag of 5 to 6 years before harvest of adjacent clearcut units would be applied when possible. Riparian zones, unique and special wildlife habitats and areas of critical environmental concern would be managed the same as under the original proposed action. Most highly scenic and/or sensitive areas would be harvested at 10 percent removal per decade rather than leaving them unharvested as in the OPA. Existing developed recreation sites and one high value potential recreation site would be retained to help meet projected recreation needs. No areas would be designated and managed as Recreation Lands (see Glossary).

The land use allocations described above would protect some older forest stands. Additional blocks of older forest would be set aside for the next decade in order to maintain viable populations of old-growth wildlife species and to safeguard long-term timber production. Wildlife habitat would be protected by maintaining the OPA ecosystem corridor pattern; delineating smaller but still viable ecosystem blocks; and temporarily excluding intensive timber management rather than managing blocks on a 350-year rotation (see Appendix D). The timber production safeguard would rely on ecosystem blocks plus a few additional blocks to maintain functioning old-growth systems distributed by seed zone and elevation (see Appendix P for a description of this latter system).

FOREST MANAGEMENT TREATMENTS AND DESIGN FEATURES

Table 1-2 displays, in typical sequence, the types and levels of treatments for each alternative. Following harvest by clearcut or single tree selection, these treatments would be used to achieve prompt reforestation and to increase subsequent growth of commercial conifers. The following discussion of treatments will be in the same order as listed in Table 1-2.

Not every treatment listed in Table 1-2 would be applied to every acre. A number of treatment combinations are possible and could be employed. The purpose of this section is to discuss each treatment and quantify the magnitude of the actions. Treatments would be identified and scheduled through application of the recently adopted forest data system (Solutions to Operations and Reforestation Monitoring Systems-STORMS, USDI, BLM 1981a). For those actions required in timber sale contracts, the final determination of treatment needs would be made during timber sale planning.

Contracts, usually awarded on a competitive basis, are the means of accomplishing all timber harvest and many forest development projects. The standard and special provisions (which include mitigating measures) in a contract establish the performance standards to be followed by the contractor in carrying out the action in accordance with applicable laws, regulations and policies. In contract preparation, selection of special provisions is governed by the scope of the action to be undertaken and the physical characteristics of the specific site. The standard provisions of the basic timber sale contract, Bureau Form 5450-3, are applicable for all timber sales. Bureau manuals and manual supplements provide a variety of approved special provisions for use, as appropriate, in individual contracts. The combination of selected special provisions constitutes Section 41 of a timber sale contract.

Prior to any vegetative or ground manipulation, BLM requires a survey of the project site for plants and animals listed or proposed for listing as threatened and endangered species. If a project might affect any listed or proposed Federal threatened or endangered species or its critical habitat, every effort would be made to modify, relocate or abandon the project in order to obtain a no-effect determination. If BLM determines that a project cannot be altered or abandoned, consultation with the U.S. Fish and Wildlife Service would be initiated (50 CFR 402; Endangered Species Act of 1973, as amended).

Whenever evidence of historic or prehistoric occupation is identified during BLM activities, special surveys are undertaken to determine possible conflicts in management objectives. In addition, a Class III (complete) cultural resources inventory is required on all areas to be subjected to ground disturbing activities. This is accomplished in the pre-planning stage of a treatment, and the results are analyzed in the environmental assessment addressing the action (BLM Manual 8100, Cultural Resource Management). When a cultural resource is discovered during timber harvest or associated activities, operations in proximity are immediately suspended and may only resume upon receipt of written instructions from the authorized BLM officer. Procedures under 36 CFR 800 would then be followed including consultation with the State Historic Preservation Officer in the determinations of eligibility, effect and adverse effects.

Transportation System

Oregon Manual Supplement, Release 5-115 of April 10, 1975, would be used in preparing road construction requirements for timber sale contracts. Engineering terminology and types of construction equipment are defined in the manual supplement, and specifications for all phases of construction, reconstruction and surfacing are provided.

Methods of slope protection are provided to avoid collapse of cut-and-fill embankments. Specifications for rock pits and quarries include provisions for minimum visual intrusion, drainage and control of runoff and restoration following use.

Special stipulations are provided for the installation of stream crossing structures, such as corrugated metal culverts, so that fish passage is not impeded. These measures may include imposing gradient limitations for the structures and/or installing baffles to reduce water velocity through the culverts.

One section of the manual supplement provides design features to control and minimize erosion during road construction and throughout the design life of a road. Another section addresses soil stabilization practices including planting, seeding, mulching and fertilizing for establishment of soil-binding vegetation.

During the 10-year period, approximately 50 miles of road would be reconstructed under all alternatives. Reconstruction is required to eliminate design problems, obsolete structures (bridges, culverts) and unsafe features which exist on a portion of the 860 miles in the existing road system. On the average, an estimated 9.6 miles of new, permanent road would be constructed annually, during the decade, for the original proposed action and Alternatives 5 and 6. Alternatives 1-4, 7 and 8 would require an annual construction of 10.4, 9.7, 9.3, 8.6, 10.1 and 9.1 miles, respectively. An estimated 65 miles (520 acres) of additional roads are necessary to complete the SYUs' permanent road system (spur road construction of less than 1 mile excluded) for all alternatives except 3 and 4. Therefore, the permanent road system would not be completed until the end of the second decade. Construction standards, i.e., stream crossing, subgrade width, ditch, cut-and-fill slope requirements, and type of surfacing would be determined during the annual timber sale planning process. Basic construction operations and a brief history of transportation systems are described in detail in the programmatic environmental impact statement prepared on timber management in the western United States (USDI, BLM 1975), hereafter referred to as the BLM Timber Management FEIS.

Timber Harvest

The primary timber harvest method used during the next 10-year period would be clearcutting. An estimated 24 percent of the proposed final harvest by clearcutting (See Table 1-2 for proposed acreages by alternative) would be accomplished by ground or surface cable yarding systems. Another 47 percent would be accomplished by cable yarding systems providing partial log suspension and 16 percent providing full log suspension. The remaining 13 percent would be harvested by tractor skidding, of which 21 percent would be accomplished using "low ground pressure" equipment. This variety in logging systems is a design feature employed primarily for water quality protection and reduced soil damage. Refer to the BLM Timber Management FEIS (USDI, BLM 1975) for a detailed description of logging systems.

Timber harvest limitations pertaining specifically to clearcutting, as identified in the Church Report (U.S. Congress, Senate 1972), have been adopted by BLM. These limitations are incorporated in Oregon Manual Supplement 5424 which lists special provisions or stipulations for the logging requirements portion of a timber sale contract.

Acreage allocated to the constrained timber base (Table 1-3) for visual concerns would be harvested utilizing small clearcuts (1-3 acres) and a two-stage shelterwood method (two entries into the same stand). The first shelterwood entry, or regeneration cut, would remove 30 to 60 percent of the original stand basal area. The second entry, or final harvest cut, would occur when regeneration is established and has grown to a height that hides stumps and debris (approximately 7 to 10 years.) The acreage figures (shelterwood) shown in Table 1-2 are those proposed for regeneration cut.

Single tree selection would be employed for harvest of dead and dying timber (mortality salvage) in stands not scheduled for final harvest within the 10-year period. Mortality salvage would take place on lands in both intensive timber and constrained timber production bases and on all other lands in the event of a major catastrophic event or when beneficial to wildlife or fish. The variance in acreages proposed for mortality salvage (Table 1-2) reflects the differences in 80+ year-old timber in the timber production bases available under each alternative.

Commercial thinning would occur in intensively managed timber stands between the ages of 30 and 70 years which have attained merchantable size. The interval of treatment (ranging from 7 to 30 years) would vary by site, with poor sites having longer intervals. Acreages proposed for commercial thinning are presented by alternative in Table 1-2.

Site Preparation

Site preparation treatments are used to prepare newly harvested and inadequately stocked areas for planting a new crop of trees. Four types of site preparation treatments (broadcast burning, herbicide application, manual slashing and mechanical scarification) are planned within the SYUs for the 10-year period (Table 1-2). In addition to the conifer base lands, selected acres identified as productive conifer sites currently occupied by brush and/or unmerchantable hardwood stands would be scheduled for conversion using one or a combination of site preparation treatments (Table 1-2, footnote No. 4).

The main site preparation treatment would be broadcast burning to control competing vegetation, make planting sites accessible and reduce fire hazard. Burning would occur at times approved by the Oregon State Department of Forestry, administrators of the Smoke Management portion of the State's Air Quality Implementation Plan. Acreage requiring slash disposal by broadcast burning (Table 1-2) may receive one or more site preparation treatments.

Site preparation using herbicides (Table 1-4) is included in all alternatives except Alternative 6. Herbicides are used to control grasses, forbs, brush and undesirable tree species prior to reforestation. This treatment improves the potential for success by reducing competition for light, moisture and soil nutrients during the tree seedling establishment period. Certain lands have been identified for prescription burning, an integrated program of herbicide application and broadcast burning. These acres are identified in Table 1-4 and are included under both broadcast burning and herbicide application in Table 1-2. Application and monitoring of herbicides would be in accordance with BLM's FEIS Vegetation Management with Herbicides: Western Oregon-1978 through 1987 (USDI, BLM 1978b). See the following Plantation Maintenance and Release section for more detail.

Manual site preparation would occur on some acreage during the proposal period (Table 1-2). Treatments could consist of scalping or brush cutting and piling slash for burning.

Mechanical site preparation would consist of scarification and piling or windrowing of slash, brush and unmerchantable trees, using a bulldozer equipped with a brush blade. Operations would be restricted to slopes less than 35 percent with low soil moisture conditions and suitable soil types.

Table 1-4 Estimated 10-Year Use of Herbicides Under the Alternatives[1]

Chemical	Method	Season	Carrier	Target Species	Application Rate[2] (lbs./acre)	Estimated Acres							
						OPA	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 7	Alt. 8
SITE PREPARATION													
Atrazine	Aerial	Spring	Water	Annual and perennial grasses and forbs	4.0	1,000	1,380	1,040	1,000	670	1,090	990	475
Roundup (glyphosate)	Aerial	Spring	Water	Salmonberry, Vine Maple	3.0	1,000	1,380	1,040	1,000	670	1,090	990	475
Tordon 101 (picloram-2,4-D)	Aerial	Early Summer	Water	Preburn Spray	10.0	1,050	1,390	1,090	1,000	620	1,130	0	500
Tordon 101R (picloram)	Hand	All Seasons	Undiluted	Bigleaf Maple (cut stumps)	0.5	2,000	2,750	2,080	2,000	1,340	2,190	1,970	950
STAND RELEASE													
2,4-D	Aerial	Summer	Water	Red Alder, Ceanothus, (mixed hardwoods)	2.0	500	700	520	510	350	550	490	470
2,4-D	Aerial	Spring	Water & Diesel	Red Alder, Ceanothus, (mixed hardwoods)	3.0	500	700	520	510	340	550	490	470
Garlon 3A (triclopyr)	Aerial	Late Summer	Water	Bigleaf Maple	3.0	1,000	1,400	1,040	1,020	690	1,100	980	940
Roundup (glyphosate)	Aerial	Late Summer	Water	Salmonberry, Vine Maple	1.5	2,000	2,800	2,080	2,040	1,380	2,200	1,960	1,880
Krenite	Aerial	Late Summer	Water	Red Alder, Vine Maple, Blackberry	3.0	1,000	1,400	1,040	1,020	690	1,100	980	940

[1] Herbicides would not be used under Alternative 6.

[2] Active ingredients (in total pounds) applied may be figured by multiplying the application rate by the estimated acres under each alternative.

Planting

To achieve adequate reforestation within 5 years following harvest on timber production lands, harvested areas would be planted with commercial conifers within 1 year of the completion of harvesting. Planting stock is nursery grown from seed collected on sites and at elevations similar to the specific project area. Additionally, the planting of genetically improved seedlings would be scheduled (see Table 1-2, footnote 5). The "genetic tree improvement program", which is designed to increase tree growth, will be phased in over the next five decades. Diversity in the gene pool (see Glossary) will be maintained through establishment of a preservation orchard containing approximately 900 selected trees and by reforesting with "natural" seedlings (i.e., grown from naturally pollinated seed) on 10 percent of the harvest acres in each breeding unit (see Glossary). The broad selection of parent trees for genetically improved stock is an additional safeguard intended to maintain genetic diversity (BLM Instruction Memorandum OR 79-334).

Reforestation experience in the SYUs shows that target stocking levels of 245 to 320 trees per acre, depending on site class, cannot always be achieved in the initial planting. Post-treatment surveys would be conducted to determine the rate of survival and whether replanting or interplanting would be required to meet stocking standards.

Plantation Protection

Estimated acreages that would require some type of protective treatment are shown in Table 1-2. Depending on the alternative, approximately 300 to 500 acres infected with laminated root rot would be treated to restrict spreading of the disease. Another treatment would protect seedlings from the sun by shading them with wooden shingles or wax-coated cardboard. Seedlings would be protected from deer, elk, mountain beaver and other small animals by plastic tubing or netting, bud capping and application of big game repellant (BGR). Mountain beaver would be trapped when they occur in significant numbers in a plantation. Seed orchards and progeny test sites would be fenced. Specific areas requiring each of these treatments would be identified in conjunction with normal reforestation surveys.

Plantation Maintenance and Release

Plantation maintenance treatments (see Glossary) promote the survival and establishment of conifer seedlings. Release treatments (see Glossary) reduce competition for light, moisture and nutrients between shrubs or grass and existing commercial conifer seedlings and promote dominance and growth of established conifers.

Fast-growing hardwoods, such as red alder or vine maple, overtop and suppress slow-starting conifer seedlings. The degree and type of competition vary by site. On dry sites, grass competes effectively for water. Elsewhere, hardwoods grow rapidly, shutting out essential light and competing for water during periods of low soil moisture. With reduced competition, conifers grow rapidly beyond the point where they can be overtopped and further suppressed by surrounding vegetation. When this growth situation is achieved (approximately 3 to 10 years from planting), no further control of competing vegetation is necessary.

Each area proposed for maintenance or release treatment would undergo a site-specific environmental analysis. During this analysis, various methods of vegetation control would be considered (chemical, manual and mechanical).

In recent years, herbicides (see Table 1-4) have been used effectively to inhibit the growth of competing vegetation, thus increasing available water, nutrients and light for suppressed conifers. Herbicides are applied aerially or by several ground methods. The method of application selected is dependent on costs, topography, equipment limitations, kind and distribution of target plants, potential environmental impacts and biological conditions. Most herbicides proposed for use in the SYUs would be applied by helicopters equipped with positive shut-off spray systems to limit herbicide application to target areas. Helicopter application would be accomplished under contract through the competitive bidding process.

Timing of herbicide application is stringently controlled. Temperature, humidity and wind direction and speed must be measured and assessed prior to and during application. BLM has full authority to order cessation of operations based on adverse field conditions. Equipment and operators are frequently checked by field project supervisors. Only registered chemicals would be used and in accordance with instructions on container labels. Handling, storage and application of chemicals would be in accordance with Oregon Forest Practices Act rules (see the Interrelationships section, State and Local Government).

Design features included in herbicide project plans and contracts for application receive site-specific environmental analysis. Analyses addressing specific herbicide projects are prepared and tiered (see Glossary) under BLM's FEIS Vegetation Management with Herbicides: Western Oregon - 1978 through 1987.

Procedures for protecting stream buffers (determined according to stream classification and herbicide used) and monitoring of herbicide application are described in the FEIS mentioned above. Continuous administration of spraying contracts in progress is required. Water samples of adjacent streams are taken prior to spraying to establish baseline quality and at specified intervals thereafter.

The use of herbicides for release is included in all alternatives except Alternative 6. Table 1-4 shows the chemicals, target species and estimated acreage of herbicide use as proposed during the 10-year period. Alternative 6 employs manual methods for release of approximately 2,200 acres. Depending on the alternative, approximately 400-800 acres would receive manual treatment during the 10-year period. Manual release would consist of clearing around selected commercial tree species using hand tools.

Precommercial Thinning

Precommercial thinning would be applied to timber stands between 10 and 20 years of age which contain over 500 stems per acre. This treatment concentrates available nutrients, moisture and light on selected trees, decreasing the time needed to reach merchantable size.

The number of trees removed per acre during precommercial thinning is dependent on the density of a stand before thinning and desired spacing at first commercial harvest. While average spacing is approximately 12 feet, the number of crop trees left may vary between 245 and 320 per acre. Contract specifications, emphasized by field instructions to crews, cover desired spacing of crop trees and criteria for crop tree selection.

Fertilization

Portions of precommercially and commercially thinned areas would be fertilized (Table 1-2). Prior to fertilization, a detailed on-site soil analysis would be employed to determine composition of fertilizer needed, rate of application and timing between applications. The average application is expected to be 200 pounds of nitrogen per acre beginning when a stand is precommercially thinned and at 10-year intervals thereafter until 10 years before final harvest. In addition to acceleration of growth for up to 7 years following treatment, fertilization helps overcome the temporary nutritional imbalances (shock) caused by other forest management practices such as slash burning, herbicide application and thinning.

COMPARISON OF IMPACTS

Table 1-5 is a summary of some impacts anticipated under each alternative. All impacts are described in Chapter 3. Selected impacts are summarized in this chapter to give decisionmakers and reviewers an overview of major issues, alternatives and anticipated changes in existing conditions.

The major issues involved in future timber management are wildlife habitat modification and impacts on economic conditions. With regard to habitat modification, the most significant long-term impact would be harvest of all but 6,100 acres of old-growth forest under Alternative 1. Populations of plants and animals associated with old-growth forest would decline on BLM-administered land as old growth is harvested. Under Alternative 4, old growth would be reduced by harvesting during the next five decades, but in the sixth decade, the amount of old growth would stabilize and begin to increase to the benefit of plant and animal species.

Alternative 1 would be most beneficial to the economic situation, providing an estimated 1,029 more jobs than the No Action program. Alternative 4 would have the greatest adverse impact, providing an estimated 848 fewer jobs than the No Action program.

IMPLEMENTATION

Final Decisions

After release of the final EIS (and following the comment period) the District Manager will review the public comments on both draft and final EISs and prepare a record of decision. The recommended decision may be to select one of the EIS alternatives intact, or to blend features from several alternatives that fall within the range of actions analyzed in the EIS. The final decision will be made by the State Director. Significant conflicts, alternatives, environmental preferences and economic and technical considerations will be addressed in the record of decision, which is expected later in 1983.

Table 1-5 Summary of Impacts

Environmental Components Impacted	Units of Measure	Existing Condition	Change in Existing Conditions (Totals or Ratings)									Remarks
			OPA	Alt. 1 Max. Tbr.	Alt. 2 Emp. Tbr.	Alt. 3 Mod. Tbr.	Alt. 4 Emp. Other	Alt. 5 Acc. Tbr.	Alt. 6 No Herb.	Alt. 7 No Action	Alt. 8 NPA	
Soils												
Productivity	Equivalent acres of lost productivity/ decade	2,837	1,578	1,748	1,462	1,613	1,158	1,769	1,619	1,706	1,594	Impacts from compaction, topsoil removal, dry ravelling, debris avalanches and debris torrents.
Water Resources												
Water yield	ac. ft./year	897,320	890,312	899,267	891,312	890,625	883,143	892,566	889,316	890,802	890,800	Annual total at end of 1st decade.
Sediment yield	tons/year	24,802	23,815	25,720	24,027	23,865	22,265	24,285	23,607	23,938	23,891	Annual total at end of 1st decade.
Vegetation												
Acres denuded												
Road construction	acres/decade	1,780	771	828	776	743	685	771	771	805	729	
Plant Habitat Altered by Herbicide use	acres/decade	14,765	10,050	13,900	10,450	10,100	6,750	11,000	0	8,850	7,100	
Timber harvest	acres/decade	26,865	16,107	20,865	15,194	16,214	10,822	17,345	15,560	16,801	16,695	
Wildlife Habitat												
Total habitat modified	acres/decade	34,900	28,500	35,400	28,100	29,900	19,800	29,700	27,900	30,700	27,200	Roads, harvest, precommercial thinning and stand conversion.
Early successional stage 5th decade	acres	25,200	34,300	39,500	35,400	35,200	23,800	35,500	31,500	25,500	35,200	Habitat less than 15 years old.
Mature stage, 5th decade	acres	10,900	11,300	3,600	14,000	11,000	23,100	11,300	11,600	8,500	10,900	Habitat 116-195 years old.
Old-growth stage, 1st decade	acres	27,300	20,800	19,800	20,500	21,300	22,700	20,400	21,100	11,000	21,200	Habitat 196 years and older.
Old-growth stage, 5th decade	acres	27,300	11,400	6,100	7,900	12,900	15,200	11,400	11,400	4,000	11,000	" " "
Wildlife												
Elk	Population level	Moderate	+	- -	-	+	++	+	+	- -	+	Change during next 5 decades
Old-growth-related species	Population level	Low	-	- -	- -	-	-	-	-	- -	-	Change during next 5 decades
Spotted owls	Locations	15[1]	10	0	5	10	9	10	10	1	7	Change at end of 1st decade using 300/900-acre criteria.
Spotted owls	Locations	12[1]	2	0	0	0	0	2	2	1	3	Change at end of 1st decade using 1,000-acre criteria.
Fish												
Habitat	Resource conditions	Fair	+	-	0	+	+	+	+	-	+	Change during next 5 decades.
Populations	Population levels	Moderate	+	- -	0	0	++	+	+	0	+	Change during next 5 decades.

Table 1-5 Summary of Impacts (Continued)

Environmental Components Impacted	Units of Measure	Existing Condition	Change in Existing Conditions (Totals or Ratings)									Remarks
			OPA	Alt. 1 Max. Tbr.	Alt. 2 Emp. Tbr.	Alt. 3 Mod. Tbr.	Alt. 4 Emp. Other	Alt. 5 Acc. Tbr.	Alt. 6 No Herb.	Alt. 7 No Action	Alt. 8 NPA	
Recreation												
Facility oriented	Resource conditions	Good	-	- -	0	-	+	-	-	0	-	Change during next 5 decades.
Non-facility oriented	Resource conditions	Fair	+	-	-	0	++	+	+	-	+	Change during next 5 decades.
Cultural Resources												
Known sites	Resource conditions	Fair	0	-	0	0	0	0	0	-	0	Change during next 5 decades.
Visual Resources												
VRM Class I	Resource condition	Good	0	- -	0	0	0	0	0	- -	- -	Change during next 5 decades.
VRM Class II	Resource condition	Fair	-	- -	- -	0	+	-	-	- -	-	Change during next 5 decades.
VRM Class III	Resource condition	Fair	-	- -	-	-	+	-	-	- -	-	Change during next 5 decades.
VRM Class IV	Resource condition	Poor	+	-	-	+	+	+	+	-	+	Change during next 5 decades.
Potential Areas of Critical Environmental Concern	Resource condition	Good	0	- -	-	0	0	0	0	- -	0	Change during next 5 decades.
Energy Use	Trillion Btu's consumed/year	.330	.468	.599	.469	.462	.331	.495	.425	.450	.461	Average annual consumption during first decade
Socioeconomic2/												
Total earnings	$ thousands	$34,275	+$4,297	+$16,324	+$4,941	+$4,644	-$ 9,436	+$7,560	+$2,343	+$2,104	+$5,099	Changes compared to existing condition
Total employment	jobs	2,610	+ 319	+ 1,201	+ 362	+ 344	- 698	+ 561	+ 174	+ 150	+ 379	" " "
O&C payments4/	$ thousands	$10,173	+$1,341	+$ 5,162	+$1,594	+$1,467	-$ 2,961	+$2,353	+$ 708	+$ 708	+$1,620	" " "
Total earnings	$ thousands	3/	+$2,193	+$13,934	+$2,838	+$2,543	-$11,539	+$5,455	+$ 238	$36,378	+$2,996	Changes compared to no action condition
Total employment	jobs	3/	+ 169	+ 1,029	+ 212	+ 194	- 848	+ 411	+ 24	2,759	+ 229	" " "
O&C payments4/	$ thousands	3/	+$ 633	+$ 4,454	+$ 886	+$ 759	-$ 3,669	+$1,645	0	$10,881	+$ 912	" " "

+ = Beneficial - = Adverse 0 = None or Negligible

1/ Locations which presently meet 300/900-acre or 1,000-acre criteria.

2/ See Chapter 3, Impacts on Socioeconomic Conditions, for discussion of dual impact measures.

3/ Base condition for these impacts shown under Alternative 7, No Action.

4/ Data artificially derived. See footnote No. 1 in Table 3-22.

Monitoring and Studies

BLM land management programs are monitored in various ways. Currently, forest management practices are monitored primarily through administration of contracts under which most actions are authorized. Timber sale contracts are inspected at least once a week, when active, and more often if sensitive operations are in progress. Daily administrative visits are not uncommon when harvest is moving at a fast pace, slash disposal is occurring or road construction involving critical aspects (such as stream crossing structures) is taking place. Service contracts for activities such as tree planting, precommercial thinning, tubing, manual brush cutting and fertilization are monitored at regular intervals to determine the quality and quantity of completed work. Depending on experience of the contractor and rate of progress, visits to these operations vary from twice a week to the full-time presence of a Bureau contract administrator. Daily visits usually occur when there is reason to believe that the operator will require help in interpreting contract requirements.

Effectiveness of silvicultural treatments is monitored through a series of inventories and surveys performed at various times during a stand's life. Appropriate stocking surveys (see Glossary) are performed prior to and after a treatment is accomplished. Information from these surveys identifies the need for or success of a particular silvicultural treatment. This information is documented and maintained in operations and reforestation records systems.

In addition, plans are in progress for expansion of current inventory plots (see 1978 Forest Reinventory, Appendix B) to measure actual growth responses from fertilization and thinning programs in the SYUs.

Water quality monitoring would be carried out in accordance with Executive Orders 11514 (partially amended by 11991) and 12088, Sections 208 and 313 of the Clean Water Act (PL 95-217, PL 92-500 as amended), BLM Manual 7240 and Oregon Department of Environmental Quality Memorandum of Understanding (MOU-OR 158). Standard analytical methods would be followed.

Additional monitoring systems for forest management and other resource management programs (wildlife, watershed, visual, cultural, recreational, etc.) as identified and outlined in the final decision would be developed and implemented.

Requirements for Further Environmental Analysis

This environmental impact statement may best be described as a regional statement for the proposed 10-year timber management plan and is considered applicable for the decade. Site-specific environmental analysis and documentation (including categorical exclusion where appropriate) will be accomplished for each type of treatment under consideration. Interdisciplinary impact analysis will be tiered within the framework of this and other applicable environmental impact statements.

An environmental assessment of a timber sale (or group of sales) will address the effects of the harvest method, yarding system, road construction or terms of a timber sale contract. Environmental analysis of forest development projects such as precommercial thinning, animal damage control, fertilization and herbicide applications will also be accomplished. With problems and conflicts identified through analysis, the proposed project can be designed in an environmentally sensible manner. Where the action is to be accomplished by a contractor, the environmental assessment is a primary means for determining appropriate contract stipulations. Projects to be accomplished by BLM personnel are conducted in accordance with the findings of the analysis and decision documents.

If an environmental assessment indicates potential for significant impacts not already described in an existing EIS, an environmental impact statement or a supplement to an existing EIS may be required.

INTERRELATIONSHIPS

Due to the scattered nature of BLM-administered land in the SYUs, coordination of timber management activities with adjacent landowners and managers is essential. Good working relationships are established and will continue in the future. BLM also works closely with other government agencies responsible for special resource management coordination programs. The following subsections provide a brief description of major interrelationships involving timber management.

Federal Government

The Eastside Salem SYUs share in part common boundaries with the Mt. Hood and Willamette National Forests. Coordination between the Salem District Manager and the Forest Supervisors is routine. Specific project and program coordination takes place as needed between all management levels of each agency and also between resource specialists. A cooperative agreement provides for interagency road construction and use.

The U.S. Army Corps of Engineers (Corps) has the authority, under Section 404 of the Clean Water Act of 1977 (P.L. 95-217), to regulate the discharge of dredged or fill materials into any estuary, wetland or stream in the United States with a flow in excess of 5 cubic feet per second. Based on the adequacy of BLM environmental protection practices, the Corps has issued BLM a general permit for dredge or fill activities. Under the permit, BLM provides the Corps, the State Division of Lands and certain environmental review agencies with advance notice of specific proposed projects.

The U.S. Fish and Wildlife Service administers the Endangered Species Act of 1973 (as amended). Accordingly, BLM consults with that agency when it is determined that a threatened or endangered species or its critical habitat may be affected. The purpose of consultation is to avoid impacts to the species in question. Such consultation may result in modification or abandonment of an action.

The National Marine Fisheries Service (NMFS) is responsible for oversight and evaluation of activities which may affect marine, estuarine and anadromous fishery resources. NMFS participates in comprehensive land and water use planning under the terms of the Water Resources Planning Act, the Coastal Zone Management Act, and the National Environmental Policy Act and makes recommendations for maintenance or enhancement of anadromous fishery resources under the terms of the Fish and Wildlife Coordination Act.

The Soil Conservation Service (SCS) is responsible for all aspects of the National Cooperative Soil Survey. Accordingly, BLM has a cooperative agreement with SCS that provides for the development and utilization of soil surveys on lands that are of interest to the Bureau. The soil survey data provide a basis for efficient interpretations for the Bureau planning and management systems.

The National Park Service (NPS) administers the Nationwide Rivers Inventory, as provided under the National Wild and Scenic Rivers Act of 1968. Present efforts are directed toward inventory and evaluation to determine which free-flowing rivers and river segments are suitable for possible designation as components of the National Wild and Scenic Rivers System. BLM consultation with NPS is required if proposed management actions could alter a river's ability to meet established Wild and Scenic Rivers Act eligibility and/or classification criteria.

State and Local Governments

Section 202(c) of the Federal Land Policy and Management Act requires BLM to coordinate its planning efforts with those of State and local governments; assist in resolving inconsistencies in mutual planning efforts; provide for State and local government involvement in development of BLM land use programs, regulations and land use decisions; and develop BLM resource management plans and programs consistent with those of State and local government to the extent that such BLM plans and programs are also consistent with Federal law and regulations. BLM coordination efforts involve a number of State and local administrative and planning agencies as highlighted below.

The Intergovernmental Relations Division for the State of Oregon is the Clearinghouse for State agencies. Notices of all BLM planning and major proposed actions are provided for coordinated State level review by the State Clearinghouse. Regional Councils of Government serve as the clearinghouses for coordinated review of proposed BLM activities by county and local governments in their respective areas of interest. BLM involvement with the four counties in the SYUs is largely via boards of county commissioners and departments, such as planning, roads and parks. Through these bodies, county governments participate in planning for land use, road construction and recreational developments on public lands administered by BLM.

The Oregon Land Conservation and Development Commission (LCDC) administers the State comprehensive land use planning program as provided in Oregon State Statutes, Chapter 197 (ORS 197). Under this program, county and local governments are required to develop comprehensive land use plans and implementing ordinances consistent with 14 statewide planning goals and guidelines. These call for a balance between conservation and development to best meet public needs. The relationships of the Eastside Salem alternatives to the LCDC goals are shown in Table 1-6.

Throughout the planning process, BLM has worked with the four counties in the Eastside Salem SYUs to achieve consistency with local plans. Methods of involving local governments have included: (1) frequent informal contacts to discuss local planning concerns; (2) invitations to participate in public tours, workshops and meetings; and (3) discussions with county commissioners and planning departments to determine consistency of BLM's preferred land use plan with acknowledged local plans.

The status of county plans involving lands in the SYUs as of May 31, 1983, is shown below:

County	Plan Adopted (By Board of Commissioners)	Plan Acknowledged (Accepted by LCDC)
Clackamas	x	x
Linn	x	
Marion	x	x
Multnomah	x	x

When the draft EIS was released, the counties were asked to determine the consistency of timber management alternatives with adopted or acknowledged plans. County responses were considered in revising the final EIS.

The Oregon State Forester, by means of the Forest Practices Act of 1972, regulates timber harvest methods and supportive practices on all non-Federal lands within the SYUs. Minimum standards are prescribed relating to the following forest practices:

- Timber harvesting.
- Reforestation of economically suitable lands.
- Road construction and maintenance on forest land.
- Chemical applications.
- Slash disposal.
- Stream buffers.

Although Federal agencies are not bound by State forest practice rules, BLM minimum standards meet or exceed State rules. The BLM and U.S. Forest Service (USFS), acting jointly, have entered into a Memorandum of Understanding with the State Forester in this regard.

In order to comply with the Clean Air Act of 1963 (as amended), BLM cooperates in the statewide Smoke Management Plan administered by the Oregon State Forester. The primary objective of the plan is to keep smoke from prescribed fires away from population centers and other smoke-sensitive areas. Slash burning is allowed only when smoke dispersion conditions are determined by Oregon State Department of Forestry (OSDF) to be favorable.

Table 1-6 Relationships of Eastside Salem Alternatives to LCDC Statewide Goals[1]

LCDC Statewide Goal Number and Description	Discussion
1. To insure citizen involvement in all phases of the planning process.	BLM land use planning process provides for public input at every stage--from assistance in the initial inventory to identification of management opportunities, development of alternatives, environmental analysis and final decision.
2. To establish a land use process and policy framework as a basis for all decisions and actions.	All alternatives have been developed in accordance with the land use planning process authorized by the Federal Land Policy and Management Act of 1976 which provides a framework for all decisions and actions.
4. To conserve forest lands for forest uses.	The planning area is predominantly forest land. The alternatives provide retention of inventoried forest lands for forest uses. The original proposed action and Alternatives 1, 2, 3, 5 and 8 place emphasis on increased timber production. Alternative 4 stresses non-timber values, Alternative 6 excludes use of herbicides in forest management and Alternative 7 would require a reversion to 1972 management goals and no increase in timber production. Alternatives 1 and 5 would exceed the productive capacity of the land base.
5. To conserve open space and protect natural and scenic resources.	All alternatives conserve open space and protect mineral resources. All alternatives except 1 protect scenic resources to some degree. Adverse impacts to visual resources, cultural resources, wildlife habitat, water resources and unique natural areas are greatest under Alternative 1 and least under Alternative 4 (see Table 1-5).
6. To maintain and improve the quality of the air, water and land resources.	Only Alternative 1 does not address enhancement of land and water quality for multiple use of forest lands. Under all alternatives, smoke from slash burning will affect air quality, primarily at upper atmospheric levels. All alternatives would comply with the statewide smoke management plan.
7. To protect life and property from natural disasters and hazards.	All alternatives include identification of potential hazard areas and general BLM program and operational measures for protection of life and property from natural disasters and hazards.
8. To satisfy the recreation needs of the citizens of the State and visitors.	Alternative 4 would meet recreation needs on BLM-administered land by the addition of developed sites, designation of recreation lands or designation of other areas for specific activities. The original proposed action and Alternatives 2 through 8 would provide opportunities to meet most recreation needs through similar, but fewer, provisions. Alternative 1 would fail to adequately meet increasing needs.
9. To diversify and improve the economy of the State.	Alternative 1 would increase timber production for greatest economic return but would lack diversity in that little or no special attention would be given to non-timber values. Alternatives 1 and 5 would assist in filling the forthcoming timber supply gap, provide a moderate, long-term increase in economic return from timber harvest and maintain diversity of non-timber values. With the exception of short-term, accelerated timber harvest returns, the original proposed action and Alternatives 2, 3 and 8 would provide economic benefits similar to Alternatives 1 and 5. Alternatives 4 and 6 would not provide for increased timber production.
13. To conserve energy.	Conservation and efficient use of energy sources are objectives in all BLM activities. Use of cull logs and slash for chips and firewood is encouraged.

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[1] LCDC goals not generally applicable to the alternatives are: 3. Agricultural Lands; 10. Housing; 11. Public Facilities and Services; 12. Transportation; 14. Urbanization; 15. Willamette Greenway; 16. Estuarine Resources; 17. Coastal Shorelands; 18. Beaches; and 19. Near Shore Ocean and Continental Shelf.

OSDF is the primary contractor for fire protection of public lands administered by BLM in the SYUs. The department undertakes presuppression and suppression actions for all lands in the area and cooperates with BLM's prescribed burning program.

The Forestry Program for Oregon (Oregon State Department of Forestry 1977) outlines basic objectives of the Oregon State Board of Forestry for timberland management within the State. The relationship of the alternatives to these basic objectives is shown in Table 1-7.

Management of fish and wildlife within the SYUs is the responsibility of the Oregon Department of Fish and Wildlife (ODFW). BLM, in managing lands under its jurisdiction, considers wildlife habitat as a resource category. The Sikes Act (P.L. 93-452), as amended, is the primary tool guiding coordination between BLM and the ODFW. Cooperative agreements and memorandums of understanding describe the specific responsibilities of the two agencies.

Oregon Revised Statute 496.012 establishes goals for the management of the State's wildlife. The consistency of the EIS alternatives with these goals is shown in Table 1-8.

The Oregon Department of Environmental Quality (ODEQ) has lead responsibility for statewide water quality management planning in accordance with the Federal Water Pollution Control Act (Section 208 of P.L. 92-500) as amended by the Clean Water Act (P.L. 95-217). BLM and ODEQ have entered into a Memorandum of Understanding (MOU-OR 158) which outlines their respective roles in meeting State water quality objectives. The Memorandum assures close interagency cooperation, development and implementation of appropriate practices and control measures to comply with the Clean Water Act and State requirements. BLM forest management practices meet or exceed objectives of the statewide water quality management plan.

Private Landowners

The major cooperative undertaking with the private sector involves access acquisition. In the SYUs, there are currently 55 right-of-way and road use agreements and 143 road easements in which BLM is involved. The right-of-way and road use agreements are reciprocal arrangements, whereby one party agrees to allow the other access across its land. An easement secures access for a fee.

Occasionally, BLM and private timber interests cooperate in planning development of adjacent holdings. This planning includes identifying mutually beneficial road and harvest locations. Joint planning helps minimize unnecessary road construction and uneconomical logging units.

The effects of road construction, harvest and reforestation on adjacent and nearby private land are given careful consideration in timber sale planning. Residences, water diversions, crops and plantations are protected as needed. Unavoidable impacts are mitigated whenever possible.

Table 1-7 Consistency[1] of the Alternatives with the Basic Objectives of the Forestry Program for Oregon

Basic Objective	Alternatives Consistent	Alternatives Minimally Consistent	Alternatives Inconsistent	Discussion
To maintain the maximum potential commercial forest land base consistent with other resource uses while assuring environmental quality.	1		OPA,2,3,4, 5,6,7,8	The benchmark for consistency is the commercial forest land base minus withdrawn TPCC lands (130,697 acres). Environmental quality would be protected to the degree specified in the Oregon Forest Practices Act. Alternative 1 would not meet management guidelines for certain lands as mandated by Congressional Acts and Federal Executive Orders (See Purpose and Need Section) because of impacts on riparian zones.
To maintain or increase the allowable annual harvest level to its fullest potential to offset potential socioeconomic impacts.	OPA,1,2, 3,5,8		4,6,7	The benchmark for consistency is the current allowable cut volume of 13.5 MM cu. ft. per year. The level of cutting the land base can sustain is dependent on number of acres allocated to timber production, level of management the land base receives and productivity of the land.
To identify and implement the levels of intensive forest management required to achieve maximum growth and harvest.	OPA,1,2, 3,4,5,8	6, 7		BLM currently implements a full range of intensive timber management practices (refer to Forest Management Treatments and Design Features, this chapter) for optimizing timber production. New and improved practices would be implemented consistent with technological advances.
To maintain community stability by remaining flexible for increases in future harvest levels that would offset projected shortages.			OPA,1,2,3,4, 5,6,7,8	The benchmark for consistency is the Salem District cooperative harvest target of 21.7 MM cu. ft./yr. as determined by OSDF. Flexibility in harvest levels would be achieved by Alternatives 1 and 5, which include a deviation from even flow.

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[1] Arrived at through consultation with Oregon State Department of Forestry (OSDF)

Table 1-8 Consistency[1] of the Alternatives with State of Oregon Wildlife Goals

Goal	Alternatives Consistent	Minimally Consistent	Inconsistent	Discussion (Long-Term Impacts)
To maintain all species of wildlife at optimum levels and prevent the serious depletion of any indigenous species.	4	OPA,5,6,8	1,2,3,7	The full ecosystem management concept and protection of riparian zones on all second order and larger streams would provide for above-optimum levels of wildlife under Alternative 4. Retention of older forest in selected areas and protection of most second order and larger streams would approach or meet optimum levels under the OPA and Alternatives 5, 6 and 8. Allowance of timber harvest in most older forest stands and in riparian zones would make Alternatives 1, 2, 3 and 7 inconsistent with this goal.
To develop and manage the lands and waters of the State in a manner that will enhance the production and public enjoyment of wildlife.	4	OPA,5,6,8	1,2,3,7	The long-rotation timber harvest under full ecosystem management and controlled harvest of riparian zones to benefit fish, wildlife, recreation and watershed values would make Alternative 4 consistent with this goal. Under the OPA and Alternatives 5, 6 and 8, smaller and fewer habitat areas would be allocated for enhancement work. Alternatives 1, 2, 3 and 7 would protect very few older forest habitat areas, thereby limiting opportunities for enhancement.
To develop and maintain public access to the lands and waters of the State and the wildlife resources thereon.	OPA,1-8			An extensive network of roads would be retained under all alternatives.

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[1] Arrived at through consultation with Oregon Department of Fish & Wildlife (ODFW)

CHAPTER 2

AFFECTED ENVIRONMENT

CHAPTER 2 AFFECTED ENVIRONMENT

This chapter addresses the environment as it exists today within the Eastside Salem SYUs. Since timber has been harvested within the SYUs for several decades, much of the environment has been affected by human use.

Chapter 2 provides a basis for assessing impacts of the alternatives. Data and analysis will be commensurate with the importance of impacts, with less important material summarized, consolidated or simply referenced.

The primary data sources used in preparing this chapter were BLM planning system documents developed by the Salem District. The Unit Resource Analysis (URA), Planning Area Analysis (PAA) and Management Framework Plan (MFP) for the Eastside Salem area are available for review at the Salem District Office.

Other references supplementary to or updating planning system data are cited within the body of the text by author and date of publication. A listing of these references appears in the References Cited section.

TOPOGRAPHY AND GEOLOGY

The SYUs are located in the Western Cascades and Willamette Valley physiographic provinces. Typical landforms in the Western Cascades include steep, east-west ridges and V-shaped canyons cut by the Sandy, Clackamas, Molalla and Santiam Rivers and tributaries. Bottomland is scarce. Volcanic geology predominates throughout the province. The Western Cascades merge to the west with rolling hills, basins and broad alluvial flats of the Willamette Valley province. Silt, sand and gravel sediments, deposited by the Willamette River and its tributaries, cover most of the province. Isolated high hills are formed by intrusive rocks that are more resistant to erosion. Ancient marine sandstones and shales are exposed in some areas.

CLIMATE

The SYUs have a marine climate with wet, mild winters and moderately warm, dry summers. Since marine air normally moves across the area, humidity is generally high. Relative humidities at night approach 100 percent throughout the year. However, humidity decreases to as low as 10 percent when masses of very dry continental air cross the Cascade Range from the east. The arrival of these air masses causes very high summer or very low winter temperatures. These conditions seldom exceed 2 weeks duration.

Average annual precipitation in the SYUs ranges from 40 inches in the Willamette Valley to 80 inches or more on the higher elevations of the western Cascade slopes. Sixty to seventy percent of precipitation falls between November and March. Below elevations of 2,000 feet, most of it occurs as rain. Snowfall increases dramatically with increased elevation. Between 1,500- and 3,500-foot elevation, snow cover usually lasts 7 to 8 weeks, averaging 10 inches in depth. Snowfall at lower elevations usually melts within a day or two.

Seasonal temperature variations are slight in the SYUs. Winter temperatures below 10° F and summer temperatures above 100° F are unusual. Mean annual temperatures range from 46° F in the higher elevations to 53° F near the valley.

AIR QUALITY

The SYUs are areas of low population density with few of the attendant vehicular and industrial air pollution sources of the nearby Willamette Valley. Air quality contamination sources within the SYUs are vehicle traffic (exhaust and dust), light industry in several small towns and burning of forest slash and grass stubble.

The largest contaminants source associated with BLM activities is slash burning. Over the past decade, BLM has burned slash in 8 to 40 timber harvest units per year, involving 250 to 1,000 acres annually. These burns add considerable amounts of smoke to the atmosphere. This smoke is made up of more than 90 percent water vapor and carbon dioxide, with some particulates and other chemical elements. During slash burning, a highly visible smoke plume is carried into the upper air by heat convection. With proper timing of burns, the smoke disperses and moves east away from population centers. Under unusual circumstances, smoke may settle over populated areas, causing local concern.

Visible smoke problems in selected areas have been monitored by the Oregon State Department of Forestry (OSDF) since 1975. The OSDF records for 1975 to 1980 show that slash burning by BLM created no visible smoke problems in that portion of the Willamette Valley adjacent to the SYUs (Oregon State Department of Forestry 1975-1981).

The Oregon Department of Environmental Quality has monitored air quality in the Willamette Valley since 1971 by measuring particulate levels in the atmosphere. The number of daily violations of particulate standards that have occurred in cities near the SYUs is shown in Table 2-1. The data indicate that particulate pollution is not a major problem in urban areas.

Table 2-1 Air Quality

Days Exceeding State Particulate Standards[1]

City	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Sandy	0	3	0	0	0	0	0	2	1	NA
Salem	1	0	0	1	0	1	1	0	1	1
Troutdale	1	0	0	0	0	0	NA	NA	NA	NA
Oregon City	9	1	1	0	0	0	1	1	3	0

[1] State standards: 150 micrograms/cubic meter (u/m^3).
Federal standards: 260 u/m^3.

NA - Not available, monitoring discontinued.

Source: Oregon Department of Environmental Quality 1980.

SOILS

Soil associations within the SYUs are shown on the general soils map (Figure 2-1). These soil associations are composed of groups of soils that have similar properties or that frequently occur together. Physical characteristics, interpretations and acreages of these soils are summarized in Appendix G.

Soils within the SYUs are generally capable of producing abundant plant growth. Most have a high content of organic matter, moderate to high nutrient levels and low densities. Soils at high elevations, however, are low in organic matter and nitrogen.

Dry ravelling (see Glossary) of soil materials, mass movement, avalanches and erosion occur naturally throughout the SYUs. Total soil loss from these factors in the undisturbed forest is 0.06 ton per acre per year (ton/ac/yr). Soil loss and loss of soil productivity (see Glossary) have accelerated as a result of timber harvesting, road construction and some silvicultural practices. In areas where road construction and harvest have taken place and regrowth is now established, soil loss is 0.08 to 0.09 ton/ac/yr but is as much as 10 times that amount in areas that have had major disturbances, such as the Quartzville Creek drainage. During the past decade, soil productivity has been lost or severely reduced on an estimated 2,000 acres of BLM-administered land.

The Bureau's TPCC system (see Appendix B) has identified fragile areas based upon factors of slope gradient, ground water, geologic material and soils with low fertility. Table 2-2 shows acres of severely, moderately and slightly fragile areas within the SYUs.

Table 2-2 Fragile Areas Within SYUs

TPCC Factors	Level of Severity (Acres) Severely Fragile	Moderately Fragile	Slightly Fragile	Total
Slope Gradient[1]	291	87	398	776
Ground Water[2]	171	32	33	236
Geologic Material[3]	2,732	23	148	2,903
Low Soil Fertility[4]	578	2,459	46,575	49,612
Combination[5]	9,943	6,368	12,492	28,803
Total	13,715	8,969	59,646	82,330

[1] Slopes greater than 70 percent; highly susceptible to debris torrents, debris avalanches and dry ravelling (see Glossary).

[2] High water tables; often unable to support commercial stands of trees.

[3] Rocky soils with a tendency to slide.

[4] Soils that are gravelly, shallow, deficient in nitrogen, moist for most of the year or highly subject to compaction.

[5] More than one factor, e.g., rocky soils on steep slopes.

A significant reduction in soil productivity has resulted from disturbing severely and moderately fragile areas.

WATER RESOURCES

The SYUs lie within the Lower and Middle Willamette River Basins. BLM-administered land is drained by approximately 464 miles of second through seventh order streams (see Glossary). These streams flow westward into the Willamette River and northwestward into the Columbia River. Channel gradients vary from greater than 10 percent near headwaters to less than 1 percent in lower valleys. Individual drainages are shown in Figure 2-2. Mean annual water yield from BLM-administered land in the SYUs is estimated to be 897,320 acre-feet. Streamflow data for selected rivers in the SYUs are presented in Water Resources Data for Oregon publications from the U.S. Geological Survey.

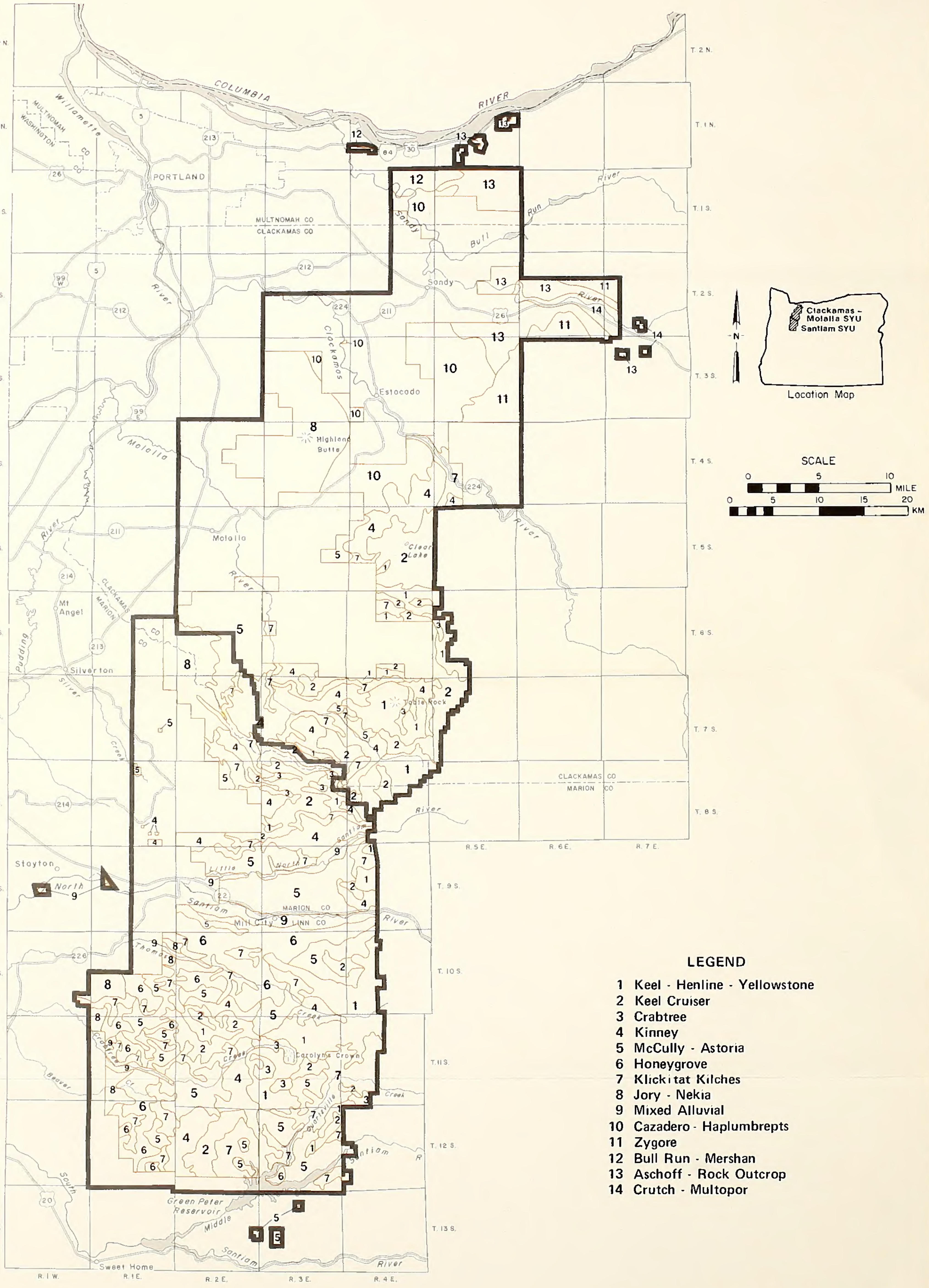
Water for 19 municipal water districts is drawn from 10 streams in all major watersheds in the SYUs. An additional 685 private water rights for domestic, agricultural, industrial and other uses are filed on lands within this area. Concerns about herbicides, bacteria, turbidity, sedimentation and altered water yields have been expressed by several municipal water districts. The percent of BLM-administered land in the SYUs that is included within each district is listed in Table 2-3.

Table 2-3 Municipal Watersheds

Water District	Water Supply Source	BLM Acres in Watershed	Percent BLM [1]
Albany	So. Santiam River	34,304	36
Canby	Molalla River	40,320	36
Clackamas	Clackamas River	14,080	18
Colton	Jackson Creek	530	19
Corbett	Gordon Creek	2,720	24
Estacada	Clackamas River	5,312	7
Gates	No. Santiam River	2,752	3
Lebanon	So. Santiam River	34,304	36
Lyons/Mehama	No. Santiam River	18,944	22
Mill City	No. Santiam River	3,592	4
Milwaukie	Clackamas River	14,080	18
Molalla	Molalla River	36,570	36
Oregon City	Clackamas River	14,080	18
Portland	Bull Run River	70	0.1
Salem	No. Santiam River	18,944	22
Sandy	Alder Creek	480	10
Silverton	Abiqua Creek	1,792	14
Silverton	Silver Creek	200	6
Stayton	No. Santiam River	18,944	22
Sweet Home	So. Santiam River	29,584	36

[1] Percent of watershed in SYUs that is administered by BLM.

Source: USDI, BLM 1980a, 1980b.



LEGEND

1	Keel - Henline - Yellowstone
2	Keel Cruiser
3	Crabtree
4	Kinney
5	McCully - Astoria
6	Honeygrove
7	Klickitat Kilches
8	Jory - Nekia
9	Mixed Alluvial
10	Cazadero - Haplumbrepts
11	Zygore
12	Bull Run - Mershan
13	Aschoff - Rock Outcrop
14	Crutch - Multopor

FIGURE 2-1

GENERAL SOILS

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SALEM DISTRICT

CLACKAMAS-MOLALLA and SANTIAM SUSTAINED YIELD UNITS

Eastside Salem Enviromental Impact Statement Area
1982

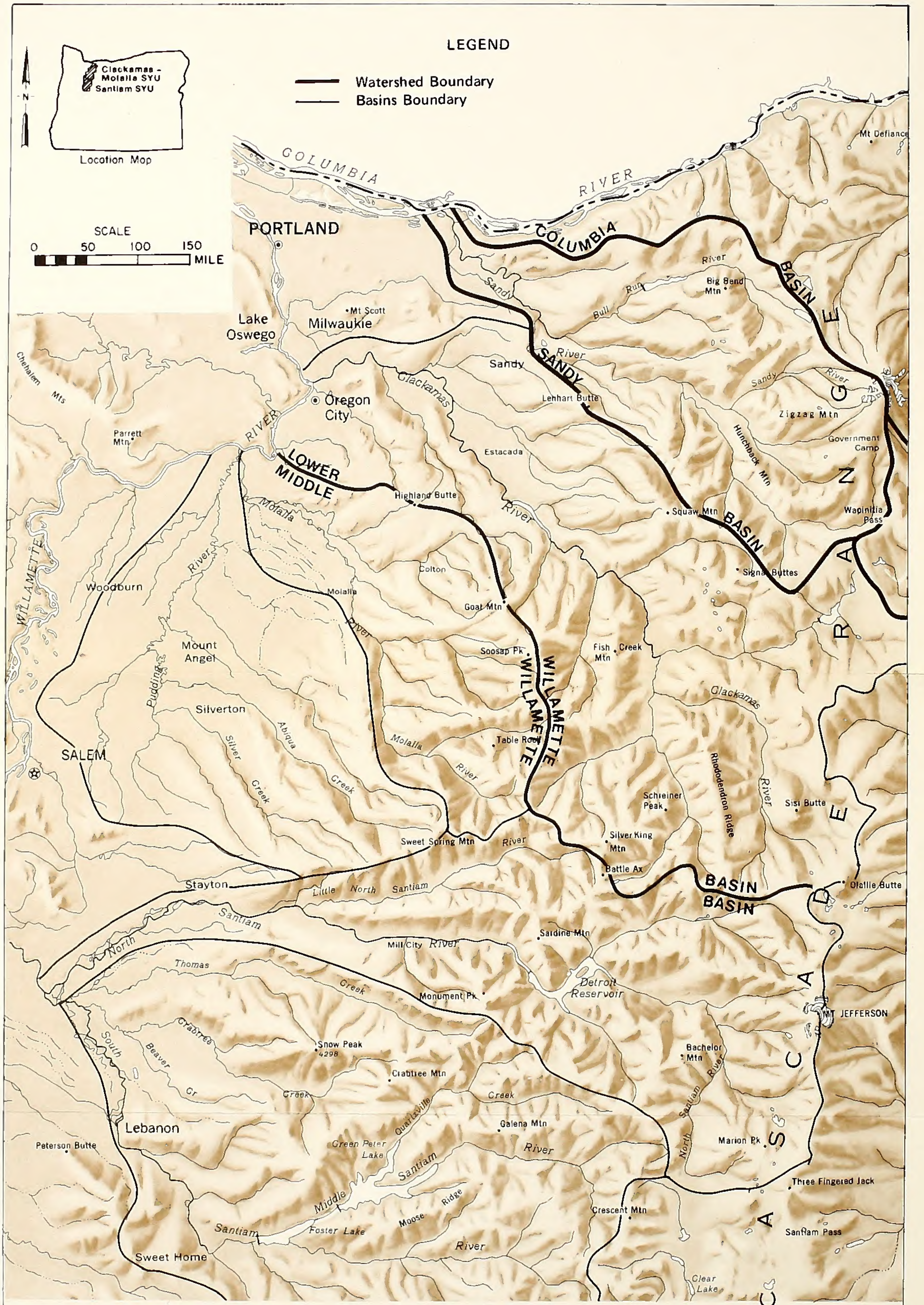


FIGURE 2-2

RELIEF AND MAJOR WATERSHEDS

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SALEM DISTRICT

CLACKAMAS–MOLALLA and SANTIAM SUSTAINED YIELD UNITS

Eastside Salem Enviromental Impact Statement Area
1983

The biological and chemical water quality conditions of selected streams were assessed and reported by the Oregon Department of Environmental Quality in 1978. The report showed that most major rivers and some tributary streams within the SYUs had moderate problem ratings with regard to sedimentation and elevated temperatures.

VEGETATION

Terrestrial Vegetation

The SYUs are located in the Northwest Coastal Coniferous Sub-biome (see Glossary). Characteristics of this sub-biome are described in the BLM Timber Management - FEIS (USDI, BLM 1975). For purposes of this EIS, vegetation is generally described in terms of "zones" adapted from those identified by Franklin and Dyrness in Natural Vegetation of Oregon and Washington (1973). A detailed description of each zone and plant community listed below may be found in that source or in reports prepared by Salem District personnel. A complete list of common and scientific names for plants is available upon request.

Portions of three major vegetative zones, Willamette Valley, Western Hemlock, and Subalpine Forests, are found within the SYUs.

The Willamette Valley Zone consists of grassland and prairie, with scattered wood lot groves of conifers and hardwoods. One-tenth of 1 percent of BLM-administered lands in the SYUs is located on the eastern edge of this zone. Major species on BLM land are Douglas-fir, grand fir, bigleaf maple, California hazel, valley oak, ocean spray and swordfern.

The Western Hemlock Zone extends from the eastern edge of the Willamette Valley Zone to the western edge of the Subalpine Forest Zone. It ranges in elevation from near sea level in the Columbia Gorge to 3,250 feet in other areas. The Western Hemlock Zone encompasses 99.3 percent of BLM-administered lands in the SYUs. Six major plant communities with various associations of trees, shrubs and forbs are found in the zone.

Associations vary according to specific conditions such as aspect, moisture, soil type and soil depth. Communities, listed from driest to wettest, are:

a. Douglas-fir, ocean spray
b. Western hemlock, golden chinkapin
c. Western hemlock, Pacific rhododendron, salal
d. Western hemlock, Pacific rhododendron, Oregon grape
e. Western hemlock, swordfern, Oregon oxalis
f. Western redcedar, western maidenhair fern, ladyfern

Douglas-fir, a subclimax species, is often the dominant tree in the hemlock zone. As a pioneer species, Douglas-fir theoretically constitutes a seral (successional) stage (See Glossary) in the development of the vegetative community.

Less than 1 percent of the SYUs (district lands above 3,000 feet) is in the Subalpine Forest Zone. This zone is divided into Pacific silver fir, subalpine fir and mountain hemlock sub-zones, all occurring on BLM-administered land. Plant communities of wet and cool micro-climates exist in association with the tree species of this zone.

Riparian vegetation occupies the transitional areas from poorly drained streambanks to better drained slopes. Vegetation in these areas ranges from a few aquatic species and the hardwood-western redcedar-hemlock type, to the predominant Douglas-fir stand usually found on slopes.

Vegetation stratification for BLM-administered land and all forested land on the west slope of the Cascades in northern Oregon is depicted in Table 2-4.

Table 2-4 Existing Forest Vegetation
Stratification of Western Cascades[1] (Acres)

Forest Vegetation	BLM	All Lands
Grass/Forb (non-stocked and 0-7 years)	16,200	253,600
Brush/Seedling (8-15 years)	9,000	191,100
Pole/Sapling (16-45 years)	32,100	540,000
Young Second Growth (46-115 years)	47,100	413,100
Mature (116-195 years)	10,900	188,900
Old Growth[2] (196+ years)	27,300	441,000
Hardwoods	5,300	--

[1] 2,028,000 acres of private, State and Federal forest lands within Clackamas, Linn, Marion and Multnomah counties. The region includes all lands east of the Willamette River, west of the Cascade crest, north of the Lane County line and south of the Columbia River.

[2] Does not include younger stands with scattered old growth.

Source: USDI, BLM; USDA, FS; Oregon State Department of Forestry; Oregon State Department of Transportation (Parks and Recreation Branch).

Wetland and Aquatic Vegetation

Wetlands are areas inundated by surface or ground water frequently enough to produce a saturated or seasonally-saturated soil condition. Examples of wetlands are marshes, swamps, bogs, wet meadows and natural ponds. Sedges, grasses, rushes, skunk cabbage, cattails and algae are typical wetland plants. There are 800 acres of known wetlands on BLM-administered land in the EIS area. They are small and widely scattered over the land base. Although these areas are not suitable for timber production, some have been disturbed by road construction or harvest of adjacent vegetation.

Sensitive, Threatened and Endangered Plants

Endangered plants are those species considered in danger of extinction throughout all or a significant portion of their range. Threatened plants are not endangered but are likely to become so within the foreseeable future throughout all or a significant portion of their range. Sensitive plants are those species not yet officially listed but undergoing a status review (see Glossary-Sensitive Species).

Botanical surveys for sensitive, threatened and endangered plants have been conducted on the Salem District since 1977. At present, no Federally-listed threatened or endangered plants are known to exist in the SYUs. However, several species observed in the SYUs are currently under review by the U.S. Fish and Wildlife Service for listing as threatened or endangered (see Appendix H). The final status of these species will be determined as sufficient data are collected.

ANIMALS

Terrestrial Animals

Vertebrate animal species within the SYUs total 65 mammals, 232 birds, 14 reptiles and 18 amphibians (see Appendix E). Each of these species adapts to a specific set of habitat conditions found within plant communities and their successional stages. The variety of habitats, each with unique structure, accounts for the diversity of animals in the SYUs.

Successional stages of plant communities in western Oregon normally progress toward the climax western hemlock forest. Different animal species occur in these various successional stages, although individual species may exist in several stages. Natural or artificial influences, such as fire and logging, can set succession back to an earlier stage. As a result, species requiring older stages are replaced by species adapted to earlier stages. For example, clearcutting of old-growth and mature coniferous forests eliminates habitat for species such as the northern spotted owl, red tree vole and northern flying squirrel while creating habitat for species like the white-crowned sparrow, dark-eyed junco and brush rabbit.

Throughout most of the SYUs, mature and old-growth forests have been converted to earlier successional stages, primarily by timber harvesting. The preponderance of young forest stands (less than 116 years old) has resulted in a trend toward reduced older forest habitat and animal diversity.

An estimate of habitat structure for all private, State and Federal forest lands within the entire Western Cascades area is displayed in Table 2-5. Bureau forest lands comprise 7.9 percent of this total. The table indicates that forest structure in the entire area is skewed toward earlier stages.

Table 2-5 Habitat Structure of Forest Lands in the Western Cascades [1] (by percent)

Habitat Type	All Lands[1]	BLM[2]	BLM Habitat as a Percent of All Forest Lands[3]
Grass/Forb (non-stocked and 0-7 years)	13	11	6
Brush/Seedling (8-15 years)	9	6	5
Pole/Sapling (16-45 years)	27	25	6
Young 2nd Growth (46-115 years)	20	32	11
Mature (116-195 years)	9	7	6
Old Growth (196+ years)	22	19	6

[1] 2,028,000 acres of private, State and Federal forest lands within Clackamas, Linn, Marion and Multnomah counties.

[2] 148,000 acres of forest land.

[3] This column indicates, for example, that while 19 percent of BLM-administered land is old growth, this is 6 percent of all old growth in the Western Cascades.

Source: USDI, BLM; USDA, FS; Oregon Department of Forestry.

Table 2-6 lists amount, condition and trend of wildlife habitat on BLM-administered land. Habitat condition ratings reflect the composite effects of three factors: composition, distribution and integrity (for individual ratings of each factor see Appendix I). Composition refers to the mix of habitat types in the SYUs. Good composition is defined as a diverse mixture of all potential habitat types. A good rating is given if existing composition closely approximates the best potential composition as determined by western Oregon BLM biologists (see USDI, BLM 1980c). Distribution refers to spacing or location of habitat types throughout the SYUs. In general, an even distribution of habitat types would provide the best situation for wildlife by providing greater edge area and opportunity for genetic transfer between animals. In contrast, an uneven distribution, where large areas would be dominated by a single habitat type, would adversely affect wildlife. Integrity refers to the amount of disruption to natural processes within habitat types. Good ratings reflect minimum disruption by intensive practices such as thinning, salvage, slash burning and herbicide application.

Table 2-6 Amount, Condition and Trend of BLM-Administered Habitat

Habitat Type	Acres	Condition[1]	Trend[1]
Conifer Forest			
Grass/Forb (NS[2]/0-7 years)	16,200	Poor	Improving
Brush/Seedling (8-15 years)	9,000	Poor	Improving
Pole/Sapling (16-45 years)	32,100	Good	Improving
Young 2nd Growth (46-115 years)	47,100	Good	Improving
Mature (116-195 years)	10,900	Good	Declining
Old Growth (196+ years)	27,300	Good	Declining
Hardwoods	5,300	Poor	Stable
Riparian	10,900 [3]	Poor	Declining
Snags	--	Poor	Declining

[1] Reflects quality and quantity of habitat.

[2] Non-stocked.

[3] All of these acres are included in habitat types listed above.

Source: Salem District personnel

The reduction of old growth represents the most serious problem for wildlife in the SYUs. Approximately 62 wildlife species find their optimum habitat in old-growth and mature forests (see Appendix E). Projections indicate that 10-20 percent of Federal forest lands will be old growth by the year 2000

(USDA Forest Service 1963). Most old growth on private lands has been eliminated. Reduced abundance of the northern spotted owl has been attributed to the decline of old-growth habitat (Forsman 1975).

Other habitat types in the SYUs have also been altered by forest harvesting. Some of these are relatively scarce within the SYUs. These habitats include: snags, riparian zones, dry meadows (2,400 acres), talus slopes (1,747 acres), wet meadows (586 acres) and other wetlands.

Snags are of special concern, since they provide optimum habitat for 49 species and are used to some extent by 36 other species of birds and mammals in the SYUs (see Appendix E). Cavity-nesting birds feed on insects and play an important role in control of forest insect pests (Thomas 1979). Under natural conditions, snags occur throughout the forest as a result of fire, disease and other factors. However, current safety and fire prevention measures have resulted in the removal of many snags in the SYUs. Recent snag surveys by district personnel revealed an average of 0.26 snags per acre on coniferous forest lands under BLM administration. At this level, primary excavators (see Glossary) are at 10 percent of potential population levels.

Riparian zones (see Glossary) are also of special importance. Approximately 155 species of wildlife find their optimum habitat in these zones (see Appendix E). Timber harvesting on BLM-administered land has modified riparian habitat on many second through fifth order and some larger streams. The importance of riparian zones as wildlife habitat is described by Thomas (1979).

Fish

The SYUs lie within the Willamette River and Columbia River drainages, areas extremely rich in anadromous fish habitat (see Glossary).

Habitat conditions have been degraded by past logging activities, road construction, mining, dams and improperly installed culverts. As a result of improved timber management practices, reestablishment of vegetation, cessation of mining and better fish passage facilities, overall condition and use of fish habitat have recently improved. Streams are considered to have a specific carrying capacity for salmonids, producing similar annual numbers of young, provided habitats are not degraded and stocks have not been overfished (Allen 1969; McFadden 1969). Streams in the SYUs are currently producing at an estimated 57 percent of potential for native salmonids. Table 2-7 shows habitat conditions and population trends for salmon and trout.

Game fish consisting of five species of salmonids, American shad, mountain whitefish and several warm water species use habitat in the SYUs. Chinook salmon, found in larger streams, are increasing in numbers with the establishment of fall runs and are nearing recent historical averages in abundance. Steelhead trout populations are increasing in numbers due to the establishment of summer runs and are above recent historical averages. Cutthroat trout, both resident and sea-run, are found at moderate levels. Moderate to high numbers of hatchery-reared rainbow trout are annually stocked in major rivers, Green Peter Reservoir and some small ponds. Sockeye salmon, found only in the South Fork Santiam drainage, are at low population levels. Moderate numbers of American shad, mountain whitefish and warm water game fish are found in larger streams.

Special concern has been expressed for the Coho salmon, whose population levels are depressed and declining. Because of its importance to the sport and commercial fishery, efforts are being made by State and Federal agencies to rehabilitate Coho salmon runs.

Table 2-7 Cold Water Fish Habitat and Populations [1]

Species	Stream Miles	Condition of Habitat[2] Exc. (%)	Good (%)	Fair (%)	Poor (%)	Habitat Trend	Current Population	Population Trend
Cutthroat	156.9	14	50	30	6	Stable	Moderate	Declining
Steelhead	63.5	12	57	29	2	Stable	Moderate	Increasing[3]
Chinook	30.5	10	55	31	4	Stable	Moderate	Increasing[3]
Coho	30.6	15	56	27	2	Stable	Low	Declining
Sockeye	7.1	--	8	92	--	Stable	Low	Stable

[1] Habitat miles, condition and trend are for BLM-administered lands only.

[2] Streams in excellent condition have riparian vegetation (see Glossary), abundant and diverse instream structure (see Glossary), numerous high quality pools, sediment-free bottom substrate, adequate spawning gravels and stable banks and channels. Streams in good to poor condition lack one or more of these characteristics.

[3] Due primarily to hatchery releases.

Source: USDI, BLM 1980a.

Many other species of fish are present in the SYUs including sculpins, suckers, dace, squawfish and shiners. Population data for these species are scarce. None are of direct commercial or sport value although some species may be eaten by trout and salmon and/or compete with game fish for food and space.

Threatened and Endangered Animals

Four species of animals, officially listed by the U.S. Fish and Wildlife Service and/or the State of Oregon as threatened or endangered, occur at least occasionally in the SYUs. Species and their status are as follows:

Threatened and Endangered Species in the SYUs	Federal Status	Oregon Status
Northern bald eagle *Haliaeetus leucocephalus alascanus*	T	T
Peregrine falcon *Falco peregrinus*	E	E
Northern spotted owl *Strix occidentalis caurina*		T
Western spotted frog *Rana pretiosa*		T

T = Threatened E = Endangered

The northern bald eagle is not known to nest on BLM-administered lands in the SYUs. Although several eagles have been seen overwintering near Green Peter Reservoir, no communal roosting sites have been found on BLM-administered land in the SYUs.

The peregrine falcon is not known to nest in the SYUs. There are no recent sightings and no historical records of breeding locations.

The northern spotted owl breeds in old-growth habitat throughout the SYUs, and 34 owl locations have been found on BLM-administered lands within this area. Of the 34 locations known to have supported owls at some time in the last six years, 29 currently have habitat that is of at least marginal quality; five have been so altered that they will not support owls. Of the remaining 29 locations, 16 were occupied during 1981. Habitat conditions at these locations are shown in Table 2-8.

Table 2-8 Habitat Conditions at Northern Spotted Owl Locations

Habitat Conditions	Locations	Locations Occupied in 1981
Poor	12	2
Fair	3	3
Good	4	4
Very Good	10	7
Excellent	0	0

Poor = Less than 150 acres of old growth within 1,200 acres. Habitat is extremely marginal and will eventually fail to support owls.

Fair = 150-300 acres of old growth within 1,200 acres. Habitat is extremely marginal and will eventually fail to support owls.

Good = 300-450 acres of old growth within 1,200 acres.

Very Good = More than 450 acres of old growth within 1,200 acres.

Excellent = More than 450 acres of old growth within 1,200 acres; old growth of excellent quality, in large blocks, with no intrusions.

Source: Salem District biologists.

Although not on the Federal list of threatened and endangered species, the northern spotted owl is on the State of Oregon list of threatened species. As old-growth coniferous forest continues to decline in western Oregon, the spotted owl may become a candidate for Federal listing.

The western spotted frog has been displaced from most of its former habitat in western Oregon by the introduced bullfrog. No spotted frogs have been found on BLM-administered lands in the SYUs.

To date, the U.S. Fish and Wildlife Service has not designated any critical habitat (see Glossary) within the SYUs under authority of Section 4 of the Endangered Species Act of 1973.

RECREATION

The forested environment, numerous roads and remaining undisturbed areas in the SYUs provide a wide variety of recreation opportunities, including camping, picnicking, fishing, hunting and sightseeing. Table 2-9 summarizes visitation for major recreation activities in the SYUs.

Table 2-9 Estimated Recreation Visitor Days

	1975 Visitor Days	
Activity	Total	BLM
Camping (developed site)	1,529,600	13,000
Picnicking (developed site)	4,187,900	63,000
Camping (dispersed)	509,900	31,000
Picnicking (dispersed)	1,396,000	64,000
Hunting (big game)	171,800	8,700
Hunting (upland game)	101,300	1,700
Fishing (salmon)	140,000	5,300[1]
Fishing (steelhead)	61,100	2,000[2]
Fishing (other)	396,200	15,100
Other Day Uses	68,734,700[3]	105,000[4]
Total	77,227,900	308,800

[1] Includes ocean sport fishing for salmon reared in BLM-managed streams.

[2] Includes downstream fishing for steelhead reared in BLM-managed streams.

[3] Total area day use visitation includes urban and semi-urban activities. This use is not generally associated with BLM-administered lands.

[4] Includes sightseeing.

Source: USDI, BLM 1980b.

Sightseeing is the major activity on BLM-administered land and the most widespread. Some higher-quality sightseeing areas are the Columbia River Gorge, Sandy River Gorge, Table Rock and Rock Corral.

Fishing and hunting are also major recreation pursuits. Some of the best hunting areas are the Molalla River and North Santiam River drainages for upland game; Larch Mountain-Sandy River area for bear; and the upper Molalla River drainage for deer. Resident trout and winter steelhead provide excellent fishing in some streams. Fishing for spring and fall chinook salmon, summer steelhead, sea-run cutthroat and mountain whitefish is rated good. North Fork Reservoir and Green Peter Reservoir provide good to excellent bank and boat angling.

Dense vegetation and steep terrain generally limit off-road vehicle (ORV) use to existing roads and trails. Areas receiving most use include the Butte Creek-Fall Creek area and the Lacomb-Green Mountain area.

Recreation trails administered by BLM are Angel's Rest, Baty Butte/Silver King, Eagle Creek, Nasty Rock and Table Rock. A 7-mile segment of the Table Rock Trail system is a potential candidate for nomination as a national recreation trail. Columbia River Gorge, Elkhorn Creek, Green Peter Peninsula and Quartzville Creek-Crabtree Mountain areas are potential locations for BLM trails.

BLM administers seven developed recreation sites (see Glossary): North Fork Eagle Creek, Wildwood, Elkhorn Valley, Canyon Creek, Fishermen's Bend, Dogwood and Yellowbottom (see Fig. 1-1). Wildwood is a large day-use development with facilities for individuals, families and organized groups. Fishermen's Bend provides camping and day-use facilities adjacent to Highway 22, a major east-west route. Use of Wildwood and Fishermen's Bend is high, and is light to moderate at other developed sites. Five locations identified for possible future development by BLM are Green Peter Peninsula, Little Meadows, Sinker Creek, Salmon Falls and Table Rock Fork/Molalla River. County parks located partially on lands leased by BLM are Sandy Oxbow and North Fork Parks. Opportunities for dispersed camping and picnicking are available throughout the SYUs.

The Table Rock and Green Peter Peninsula/Quartzville Creek areas have been identified as potential Recreation Lands, a designation which may be applied to large areas with exceptional recreation values and high potential for recreation use (43 CFR 2070). The 5,400-acre Table Rock area was proposed on the basis of its unroaded character, 10-mile ridge trail system, outstanding scenic qualities and proximity to Willamette Valley population centers. The 7,260-acre Green Peter Peninsula/Quartzville Creek area was proposed for its water-based recreation opportunities. Recreation developments, which now consist of two recreation sites on Quartzville Creek, could be increased to provide fishing, boating and camping accommodations on the peninsula.

Three areas (see Table 2-11) are proposed for Outstanding Natural Area status (see Glossary). Each has high scenic quality and provides excellent recreation opportunities. The Sandy River Gorge proposal consists of three parcels of BLM-administered land within a State Scenic Waterway. The Table Rock proposal is situated within the potential Table Rock Recreation Lands. The Soosap Meadows area is proposed for its values associated with Cascadian subalpine meadows in an undeveloped forest setting.

Phase I of the Nationwide Rivers Inventory conducted by the National Park Service has identified three potential scenic or recreational rivers crossing public land within the SYUs (see Table 2-10).

Table 2-10 Rivers Identified in the Nationwide Rivers Inventory

River	Approx. Shoreline Mileage Total Length	 Total BLM	Approx. Corridor Acreage[1/] Total	 Total BLM
Salmon	25.6	2.0	8,192	608
Clackamas	53.5	1.2	17,120	618
North Santiam	17.6	0.8	5,632	282

[1/] Total corridor width is one-half mile (one-quarter mile on each side of the river).

Source: USDI, Heritage Conservation and Recreation Service 1980; Salem District personnel.

Segments of the Sandy and Clackamas Rivers are designated Oregon State Scenic Waterways. Rivers identified as potential Oregon State Scenic Waterways within the SYUs are the North Santiam, South Santiam and Salmon.

CULTURAL RESOURCES

Federal agencies have been charged with responsibility for cultural resources (see Glossary) on lands under their jurisdiction. Through a group of laws beginning with the Antiquities Act (1906), BLM has been mandated to identify, protect and enhance such resources on public lands. A number of procedures, including those specified in 36 CFR 800.4(a), were used to identify the cultural resources within the SYUs.

A survey of existing cultural resource information (Class I inventory) has been completed for the SYUs (Minor et al. 1980) and is available in the Salem District Office. All recorded cultural sites were identified through a compilation of the area's existing site record data.

The criteria used to assess the eligibility of identified cultural resources for inclusion in the National Register of Historic Places are described in 36 CFR 60.6. The BLM also employs a cultural resource evaluation system to assess the relative value of a cultural site in terms of possible uses.

Archeological Sites

Fifty-six prehistoric archeological sites have been identified within the SYUs. Some information has been lost from all of these sites as a result of natural or human disturbances prior to discovery. Future intensive surveys will certainly result in the location of many additional sites, though it is unlikely that sites will be found in very dense concentrations.

While most of the major settlements during prehistoric times were located in the Willamette Valley, a considerable number of related subsistence activities took place in the adjacent uplands. The SYUs were used for hunting animals and gathering plant foods and raw materials. They were also crossed by an extensive network of trails serving as trade and travel routes for groups on both sides of the Cascades. Archeological evidence indicates that humans have been using parts of the western Cascades for at least 8,000 years.

Most of the identified sites in the SYUs were probably seasonal campsites. Sites of this nature are likely to be located on relatively level ground such as benches, meadows, saddles and ridgetops. Trails were primarily confined to ridgelines and the larger river valleys. In most of the SYUs, steep terrain and dense vegetation discouraged habitation, though such sites as rock shelters, rock art and spirit quest places might be encountered in any part of the SYUs.

None of the archeological sites within the SYUs are listed on the National Register of Historic Places (see Glossary), but the Table Rock Trail and two associated archeological sites have been determined eligible for inclusion.

Historic Sites

There are 115 inventoried historic sites on or near BLM-administered land within the SYUs. Of these, 88 are documented in historical records but remain unverified in the field. Most historic sites relate to settlement, transportation, mining and logging. All known historic sites have deteriorated to some extent from natural weathering and/or human disturbance.

Two historic sites within the SYUs are listed on the National Register of Historic Places. These consist of 0.2 mile of the Barlow Road (South Alternate) and Rock Corral, a campsite beside the Barlow Road.

Historic sites are protected by the same stipulations as archeological sites, and a thorough survey to identify them so they can be protected is accomplished prior to ground disturbance or ownership changes. The results of this intensive survey are documented in each site-specific environmental assessment.

Paleontological Sites

Several deposits of petrified wood, two fossil leaf sites and two deposits of fossilized clam shells have been identified within the SYUs. Some unique fossil wood sites occur along Thomas Creek (Eubanks 1960), and scattered specimens may exist on BLM-administered land in that drainage.

All reports of fossil-bearing deposits are examined by qualified personnel to avoid destruction of those which may be important.

VISUAL RESOURCES

Visual resources are the land, water, vegetation, animals and other features (as described in this chapter) visible on public lands. Since visual resource values are to be considered when planning timber management activities, all public lands have been assigned visual resource management (VRM) classes according to scenic quality, sensitivity level and distance zone criteria (see Glossary). These classes provide VRM objectives designed to mitigate and, in some situations, avoid the adverse impacts of management activities on scenic values (BLM Manual 8400). Figure 2-3 shows VRM classes derived from an inventory and evaluation of the landscape in the SYUs. Acreages of each class are listed in Table 3-14, (Existing Situation column).

The VRM classes, objectives and general class standards are:

Class I: Provides primarily for natural ecological change and preservation of scenic quality (highest level of protection). This class generally includes areas with high scenic qualities and/or high sensitivity levels.

Class II: Landscape alterations caused by management activities should not be evident in the characteristic landscape (see Glossary), and scenic quality should be retained. Changes may be seen but should not attract attention. This class generally includes areas with high to moderate scenic qualities and high sensitivity levels.

Class III: Alterations may be evident in, but should remain subordinate to, the characteristic landscape, and scenic quality may be partially retained. This class generally includes areas with moderate to low scenic qualities and high to medium sensitivity levels.

Class IV: Alterations may attract attention and dominate the view but should blend with the characteristic landscape. Scenic quality may be modified (lowest level of protection). This class generally includes areas with low scenic qualities and medium to low sensitivity levels.

Of all BLM-administered land in the SYUs, approximately 5 percent is Class I, 15 percent Class II, 25 percent Class III and 55 percent Class IV. Some Class I areas are the Sandy River Gorge, Highland Butte, Table Rock, Buzzard Butte, Yellowstone Creek and more than 30 waterfalls. Class II areas include BLM-administered lands seen from Mt. Hood Highway 26, Clackamas River Highway 224, Little North Santiam River Road and Quartzville Access Road.

WILDERNESS VALUES

Under the terms of the Federal Land Policy and Management Act of 1976 (FLPMA), roadless areas of 5,000 acres or more with wilderness characteristics are to be reviewed within 15 years for possible wilderness designation. FLPMA also states that in the event of conflict with or inconsistency between its provisions and those of the O&C Act as they relate to management of timber resources, the O&C Act shall prevail. Accordingly, the wilderness review provisions of FLPMA do not apply to O&C lands suitable for sustained yield management as commercial timberlands. No areas within the SYUs are proposed wilderness study areas.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Areas of Critical Environmental Concern (ACECs) are areas on BLM-administered lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards (FLPMA section 103(a)). Designation of an area as an ACEC does not necessarily preclude development but rather ensures the protection of sensitive values in those cases where appropriate development may take place. Prior to designation, site-specific management prescriptions are developed for each potential ACEC. Following designation, activity plans are prepared to translate the special management requirements into on-the-ground actions.

Nine areas were nominated for ACEC consideration during the Eastside Salem District planning process (see Table 2-11). Seven of these meet the criteria of relevance and importance and thus have potential for designation. The decision to designate any or all of these seven areas as ACECs will be part of the MFP decision for the SYUs, to be made following completion of this EIS. Some of the potential ACECs are also being considered for other protective designations (see Table 2-11).

SOCIOECONOMIC CONDITIONS

Public lands in the SYUs are located entirely within the four counties identified in Table 2-12. These counties, for the socioeconomic discussion, are termed the EIS area.

The EIS area lies mostly between the Willamette River on the west and the Cascade Mountains on the east. The large population (Table 2-12), which includes major portions of the Portland and Salem metropolitan concentrations, is located mainly along the Willamette. A few towns dependent on timber production exist in areas remote from the main population.

The population of the area has grown about 35 percent during the past two decades. Population growth has been greatest in Clackamas and Marion Counties.

Table 2-12 Population, 1960-1980

County	1960	1970	1980	Annual Growth Rate 1960-70	Annual Growth Rate 1970-80
Clackamas	113,038	166,088	241,919	3.9%	3.8%
Linn	58,867	71,914	89,495	2.0	2.2
Marion	120,888	151,309	204,692	2.3	3.1
Multnomah	522,813	556,667	562,640	0.6	0.1
Total	815,606	945,978	1,098,746	1.5%	1.5%

Source: U.S. Department of Commerce, Bureau of Census 1960-1980.

Personal income and labor and proprietors' income are shown in Table 2-13. Personal income is a measure of the economic welfare of the residents of an area and is generally considered to be closely related to their social well-being. Labor and proprietors' income, which represents worker earnings, is shown here as the basis for later calculations of the effect of changes in production on income. Per capita personal income for the area as a whole was above the State average in all years shown because of above average income levels in Multnomah and Clackamas Counties. Per capita income growth in the area as a whole was greater than the inflation in the Portland Consumer Price Index during the period. The two counties with the slowest population growth (Multnomah and Linn) had the largest per capita income increases.

Estimates of earnings per worker in all industries and the timber industry have been calculated by dividing total covered payrolls by average employment

Table 2-11 Nominated and Potential Areas of Critical Environmental Concern

Site Name	Approximate Size (acres)	Description[1]	Primary Resource Value	Remarks
Potential ACEC's				
1. Columbia River Gorge (Mult. Co.)	900	High quality scenic area; sensitive and relict plants.	Scenic, Botanical	
2. Sandy River Gorge (Mult.-Clack. Co.)	380	Within State Scenic Waterway; rare type of old-growth Douglas-fir forest.	Scenic, Botanical	Proposed Outstanding Natural Area (see Glossary)
3. Williams Lake (Clack. Co.)	90	Fine example of bog/ quaking bog succession; unique plant community.	Botanical	
4. Soosap Meadows (Clack. Co.)	400	Cascadian subalpine meadow; sensitive plant species.	Scenic, Botanical	Proposed Outstanding Natural Area
5. Table Rock (Clack. Co.)	5,400	High quality sightseeing opportunities; sensitive plants; historic trail.	Scenic, Botanical, Cultural	Portion (1,745 acres) is proposed Outstanding Natural Area
6. Carolyn's Crown (Linn Co.)	260	Rare example of old-growth coniferous climax forest; glaciated cirque; sensitive plant species, glaciation phase plant ecology.	Botanical	Proposed Research Natural Area (see Glossary)
7. Middle Santiam Terrace (Linn Co.)	80	Douglas-fir-western hemlock climax forest; sensitive plant species.	Botanical	
Nominated But Not Qualified for ACEC Designation[2]				
1. Shafer Creek (Linn Co.)	240	Relict vegetation; old-growth coniferous near-climax forest.	Botanical	
2. Snow Peak (Linn Co.)	2,400	Unique glaciated shield volcano.	Geological	Proposed Educational and Scientific Study Area (see Glossary)

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[1] See USDI, BLM 1981b for more detailed descriptions.

[2] Two identification criteria (relevance and importance) derived from the Federal Land Policy and Management Act (1976) were applied to evaluate all areas nominated for ACEC designation. Areas nominated but not qualified for designation failed to meet these criteria as described in the August 1980 Final Guidelines for Areas of Critical Environmental Concern (USDI, BLM 1980d).

(Oregon Department of Human Resources 1981). Earnings per worker in 1979 for all industries and for the timber industry (including pulp, paper and board) were as follows:

County	All Industries	Timber
Clackamas	$13,242	$20,193
Linn	13,971	18,521
Marion	11,888	16,878
Multnomah	14,251	19,984

Table 2-13 Personal Income and Labor and Proprietors' Income, 1975-1979

County	1975	1976	1977	1978	1979
Total Personal Income (in thousands)					
Clackamas	$1,202,076	$1,376,024	$1,600,180	$1,875,648	$ 2,156,985
Linn	392,088	460,355	542,003	610,488	676,680
Marion	945,051	1,085,385	1,267,412	1,452,781	1,649,524
Multnomah	3,765,275	4,147,120	4,582,822	5,207,274	5,878,983
Total	$6,304,490	$7,068,884	$7,992,417	$9,146,191	$10,362,172
Total Labor and Proprietors' Income (in thousands)1/					
Clackamas	$ 547,154	$ 639,331	$ 767,483	$ 923,996	$ 1,098,004
Linn	316,062	376,781	443,770	500,215	549,106
Marion	698,987	812,741	962,471	1,107,881	1,254,553
Multnomah	3,790,946	4,199,030	4,686,586	5,388,883	6,052,745
Total	$5,353,149	$6,027,883	$6,860,310	$7,920,975	$ 8,954,408
Per Capita Personal Income (in dollars)					
Clackamas	$5,963	$6,650	$7,340	$8,189	$9,063
Linn	4,872	5,575	6,407	7,064	7,554
Marion	5,699	6,299	7,195	7,936	8,760
Multnomah	6,917	7,627	8,680	9,913	10,962
Area Average	$6,353	$7,034	$7,940	$8,934	$9,848
State Average	$5,764	$6,419	$7,176	$8,078	$8,887

1/ Labor and proprietors' income is presented here by place of work in contrast to the personal income data which are by place of residence. It is representative of work force earnings only and excludes dividends, interest, rents and transfer payments which are included in personal income.

Source: U.S. Department of Commerce, Bureau of Economic Analysis 1981.

Table 2-14 shows covered employment averaged over the period 1976-1980. (Covered employment is employment covered by the unemployment compensation law and represents about 80-85 percent of total employment.) Timber production constitutes about 22 percent of manufacturing employment in the EIS area and about 4 percent of total covered employment. Omitting Multnomah County, timber industry employment represents 40 percent of manufacturing employment in the remaining three counties.

Table 2-14 Average Covered Employment, 1976-80
(Number of workers)

	Clackamas	Linn	Marion	Multnomah	EIS Area
Total	53,736	28,507	71,908	316,528	470,679
Manufacturing	13,066	11,175	10,941	53,262	88,444
Timber	4,387	6,626	3,073	5,803	19,889
Lumber & wood products	2,618	5,488	2,248	3,750	14,104
Pulp, paper & board	1,769	1,138	825	2,053	5,785
Non-manufacturing	40,670	17,332	60,967	263,266	382,235

Source: Oregon Department of Human Resources, Employment Division 1980, 1981.

Unemployment measures for individual counties in Standard Metropolitan Statistical Areas (SMSA) are not available on an official basis, but unemployment levels in local communities do tend toward the average level in their metropolitan area. Figure 2-4 shows how fluctuations in timber industry employment and overall unemployment levels have been related during the period 1975-1980. The downturn in timber employment in 1980 accelerated the rise in unemployment. Unemployment rates in 1981 remain high.

Timber Industry

The economic importance of the timber industry to the counties in the EIS area is shown in Table 2-15. Workers' earnings which are spent locally generate additional local income. The process by which additional income is created through successive rounds of expenditures following the initial receipt of income by a specific economic sector is called a multiplier effect. Estimates of the total income (earnings) generated in local areas due to the multiplier effect on workers' earnings in the timber industry are shown in the table. These earnings estimates were divided by average earnings per worker to estimate the total employment generated.

Earnings and employment generated by BLM harvests in the timber industry and in the local area overall are shown in Table 2-16. The estimates are based on harvest data for the years 1976-1978. Timber cut from BLM-administered lands provides employment in the timber industry at three stages: when timber is logged, when logs are manufactured into wood products, and when logs, wood chips and other residues from lumber and plywood mills are made into pulp, paper and board. Employment estimates for these three elements are displayed in Table 2-16.

According to these estimates, timber industry activity generated by BLM harvests amounts to about 4 percent of timber industry employment and accounts for about 0.4 percent of the total earnings of labor and proprietors in the four-county area.

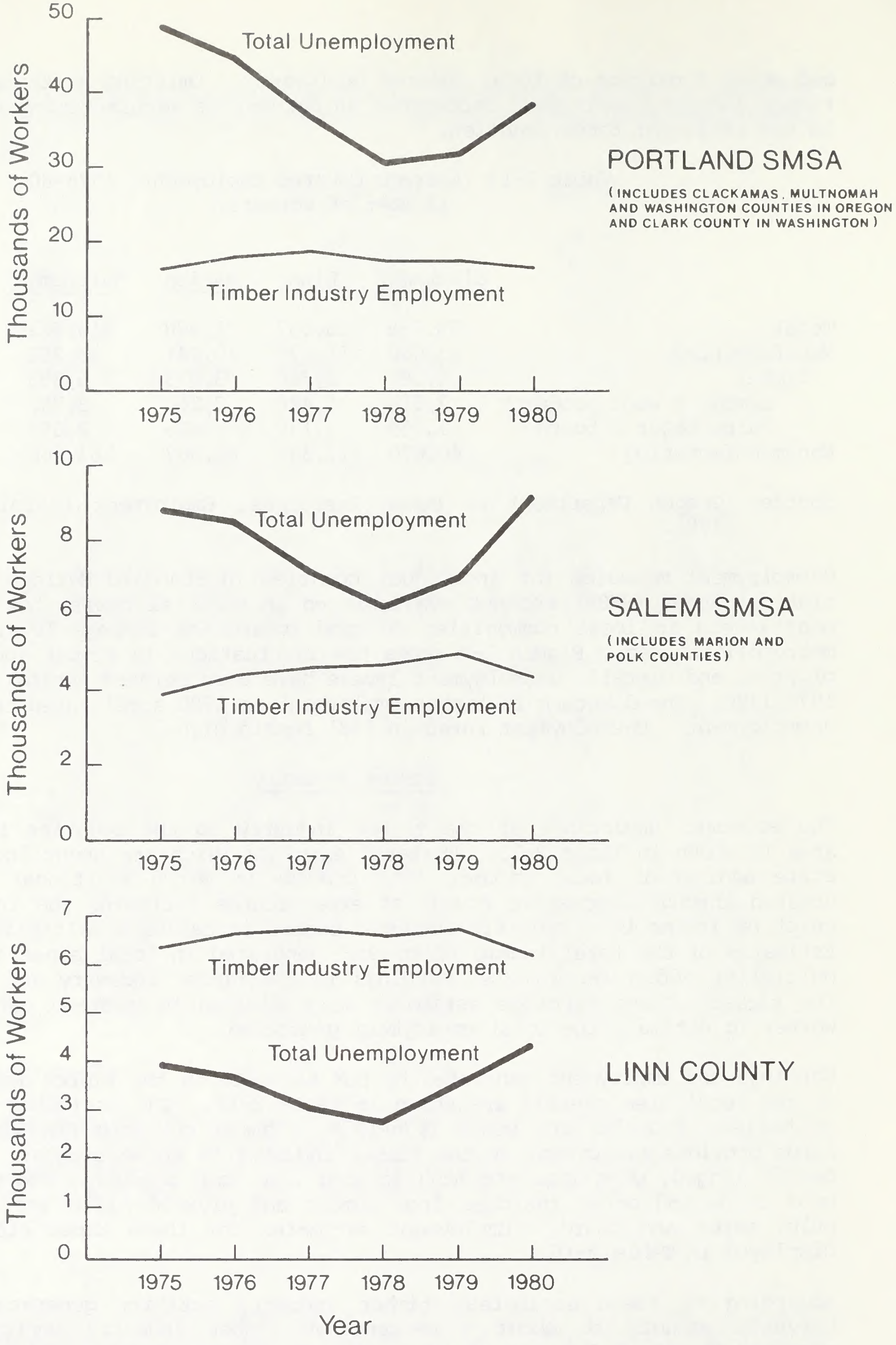


FIGURE 2-4

COMPARISON OF TRENDS IN UNEMPLOYMENT AND TIMBER EMPLOYMENT, 1975 - 1980

Table 2-15 Earnings and Employment Generated by the Timber Industry1/, 1979

Item	Clackamas	Linn	Marion	Multnomah	EIS Area
Worker earnings in the timber industry2/	$ 88,968,600	$124,036,200	$ 57,300,700	$112,388,200	$382,693,700
Earnings multiplier3/	2.584	1.638	2.547	2.156	-
Total earnings generated	$229,894,900	$203,171,300	$145,944,900	$242,310,000	$821,321,100
Av. earnings per worker - all industries4/	$ 13,242	$ 13,971	$ 11,888	$ 14,251	-
Total employment generated	17,361	14,542	12,277	17,003	61,183
Percent all employment5/	25%	43%	13%	4%	10%

1/ Includes lumber and wood products (SIC 24) and pulp, paper and board (SIC 26) industries. Omits workers in forest management activities classified as forestry, business services, and other industries.

2/ Earnings in employment covered by unemployment insurance (Oregon Department of Human Resources 1981).

3/ USDI, BLM 1978a. Multipliers shown are composites of industry multipliers for SIC 24 and SIC 26 adjusted by a factor of 1.16 to reflect earnings of proprietors omitted from earnings in covered employment. For basis, see Jackson-Klamath FEIS, Appendix I (USDI, BLM 1979).

4/ Total earnings generated is divided by average earnings per worker in all industries to estimate the total employment generated. This estimation method tends to overstate employment slightly, because worker earnings in the timber industry which account for a disproportionate share of the total income generated are substantially above average earnings.

5/ Based on estimates of total employment (BLM Oregon State Office economists).

Table 2-16 Employment and Earnings Generated by BLM Timber Harvest
(Based on 1976-78 average harvest)

Item	Clackamas	Linn	Marion	Multnomah	EIS Area
Timber harvest (MM bd. ft.)1/	28.998	38.436	12.975	.014	80.423
Logging employment ratio2/	1.780	1.415	1.780	1.780	-
Logging employment	52	54	23	-	129
Timber consumption (MM bd. ft.)1/	21.588	47.625	1.284	.002	70.499
Employment ratio2/	4.197	5.330	5.144	4.642	-
Other wood products employment	91	254	7	-	352
Pulp, paper and board employment3/	102	65	46	114	327
Employment in timber industry	245	373	76	114	808
Percent county timber employment	6%	6%	2%	2%	4%
Av. earnings/timber worker (1979)4/	$20,193	$18,521	$16,878	$19,984	-
Earnings in timber industry (x 1,000)	$ 4,947	$ 6,908	$ 1,283	$ 2,278	$15,416
Multiplier5/	2.584	1.638	2.547	2.156	-
Total earnings generated (x 1,000)	$12,783	$11,315	$ 3,268	$ 4,911	$32,277
Percent 1979 county total	1%	2%	6/	6/	6/
Av. earnings/worker - all industries	$13,242	$13,971	$11,888	$14,251	-
Total employment generated	965	810	275	345	2,395

1/ USDI, BLM 1980b. Timber harvest consumed outside the area is omitted.

2/ USDI, BLM 1980b. 1976 employment ratios for lumber mills and plywood mills developed by Wall and Oswald (1979) weighted by respective shares of 1976 log consumption in county from Howard and Hiserote (1978). Adjusted from Scribner long log to short log basis.

3/ Estimated by ratio of industry employment in county to total log consumption in EIS area.

4/ Oregon Department of Human Resources 1981.

5/ From Table 2-15.

6/ Less than 0.5 percent.

In some local communities, BLM harvests account for as much as 35 percent of timber industry log supplies (and an equivalent amount of timber industry employment). These estimates were made by comparing receipts of BLM logs (1975-77 average) with total log use estimated from timber processing employment data (Oregon Department of Economic Development 1980) assuming five workers per million board feet log use. Communities which were dependent on BLM harvests for 10 to 35 percent of their log supplies during the 1976-78 period included Molalla-Mulino in Clackamas County, and Lyons and Sweet Home in Linn County. Independence in Polk County obtained a significant part of its supplies from the SYUs in addition to supplies from BLM lands elsewhere.

Timber sale volumes from the SYUs were relatively high early in the 1970's, but were generally less than 85 MM bd. ft. in the latter half of the decade. The 1971-80 decadal average was 90.4 MM bd. ft. In the 1980 fiscal year, sales were 91.5 MM bd. ft. Timber purchasers have 3 years in which to harvest and pay for the timber purchased, and harvest schedules may vary widely from sales schedules. In Figure 2-5, a comparison of sales and harvests shows how harvest volumes have differed from sales during the past decade. Harvest volume averaged 93 MM bd. ft. per year, but varied from a high of 137 MM bd. ft. to a low of 52 MM bd. ft. In the period 1976-1978, representative of the latter part of the decade, volume averaged 80.4 MM bd. ft.

Fishing

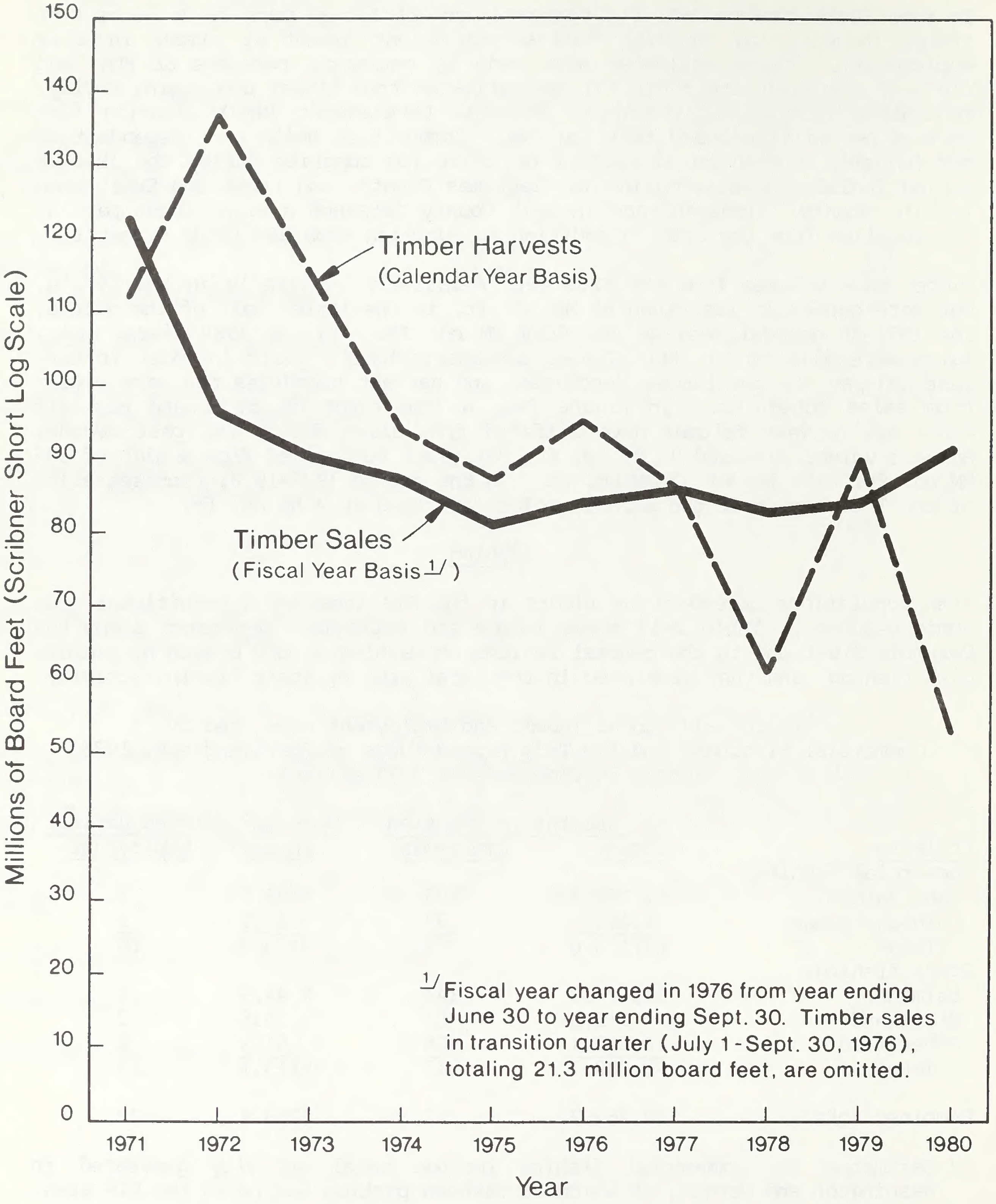
Fish populations dependent on rivers in the EIS area are a significant economic resource. Table 2-17 shows income and employment generated along the Columbia River and in the coastal regions of Washington and Oregon by commercial fishing, and that generated in the local area by sport fishing activity.

Table 2-17 Local Income and Employment Generated by Commercial Fishing1/ and the Trip Expenditures of Sport Anglers, 1975
(Income in thousands of 1979 dollars)

	All Habitat in EIS Area		BLM-administered Habitat	
Activity	Income	Employment	Income	Employment
Commercial fishing:				
Coho salmon	$1,752.4	107	$108.8	7
Chinook salmon	1,400.6	97	41.5	3
Total	$3,153.0	204	$150.3	10
Sport fishing:				
Salmon	$1,174.2	144	$ 44.5	5
Steelhead	512.5	63	16.8	2
Other fish	3,323.1	406	51.9	6
Total	$5,009.7	613	$113.1	13
Combined total	$8,162.7	817	$263.4	23

1/ Estimates for commercial fishing include total activity generated in Washington and Oregon, of which an unknown portion occurs in the EIS area.

Source: USDI, BLM 1980b; Centaur Associates 1979; Oregon Department of Fish and Wildlife 1981. Estimates adjusted to represent 1975 activity levels valued at 1979 price levels.



[1] Fiscal year changed in 1976 from year ending June 30 to year ending Sept. 30. Timber sales in transition quarter (July 1 - Sept. 30, 1976), totaling 21.3 million board feet, are omitted.

FIGURE 2-5

TIMBER SALES AND HARVESTS
EASTSIDE SALEM SYUs 1971-1980

Terrestrial Wildlife

Wildlife in the EIS area provides the basis for quantifiable amounts of hunting and trapping activity. Non-consumptive wildlife uses also generate significant values which have been included in dispersed recreation.

Local income and employment generated by hunting activity are shown in Table 2-18 for the year 1975. Income estimates have been adjusted to 1979 price levels in order to make them comparable with other monetary values in the discussion.

Fur trapping in fiscal 1978 yielded about $134,000 to trappers in the EIS area (reported fur catch valued at average fur prices) (Oregon Department of Fish and Wildlife 1980). Assuming the fur catch on BLM-administered lands in each county was proportional to BLM's share of total land area, the yield from BLM lands amounted to $5,500.

General Recreation

Local income and employment generated by recreational visits to sites or areas of the type provided by BLM (apart from those related to fish) are shown in Table 2-18. These estimates are based on the recreation visitation estimates displayed in Table 2-9.

Table 2-18 Local Income and Employment Generated
by Hunting and General Recreation Activity, 1975
(Income in thousands of 1979 dollars)

	Entire EIS Area		BLM-administered Lands	
Activity	Income	Employment	Income	Employment
Big game hunting	$ 985.4	120	$49.9	6
Upland game hunting	223.7	27	3.8	0
Hunting Total	$1,209.1	147	$53.7	6
Camping - developed sites	$ 2,497.3	305	$ 21.2	3
Picnicking - developed sites	$15,315.8	1,873	230.4	28
Dispersed recreation	1/	1/	731.4	89
Recreation Total	$17,813.1	2,178	$983.0	120

1/ Estimates for dispersed recreation in the entire EIS area are omitted because available data represent predominantly urban activities. Thus, the general recreation totals for the EIS area are not directly comparable with the totals for BLM-administered lands.

Source: USDI, BLM 1980. Income estimates adjusted to 1979 dollars. Employment estimates derived by dividing income estimates by average individual income of direct and indirect income recipients.

Public Finances

Payments are made to State and local governments from land management revenues and, in a minor amount, from appropriations. In the EIS area, such payments originate from O&C lands and other BLM-administered lands (public domain). Most of the revenues derived from these lands are from timber sales.

Fifty percent of the revenue from all O&C lands in the State is distributed among the counties with O&C lands in proportion to the 1915 assessed value of the O&C lands in each county. Total O&C revenues for the fiscal year ending September 30, 1980, were $195,214,025 of which $12,014,408, or 6 percent, came from lands administered by BLM within the EIS area. Table 2-19 shows the importance of the O&C revenue distribution to individual counties in terms of property tax equivalents. The table also indicates the wide year-to-year variations in O&C revenues caused by the variations in harvest rates and prices. O&C timber sales in the SYUs in fiscal 1980 were $24,387,747, and total O&C sales were $333,102,471; however, timber purchasers have 3 years in which to harvest and pay for contracted timber. Poor market conditions have caused a backlog of over $700 million in uncut timber to accumulate on O&C lands statewide.

Table 2-19 O&C Revenue Distribution to Counties Expressed as Property Tax Rate Equivalent and as Percent Supplement to Total Levy, FY 1977-1980

	Amount per $1,000 Assessed Value[1]				Percent Supplement to Levy[2]			
County	1977	1978	1979	1980	1977	1978	1979	1980
Benton	$3.36	$2.26	$2.03	$2.05	21.9	12.3	12.4	10.5
Clackamas	1.69	1.17	1.01	.90	6.8	5.4	5.5	4.6
Columbia	2.20	1.77	1.86	1.86	15.2	12.7	13.0	11.7
Coos	6.59	5.32	4.81	4.59	30.9	31.9	29.0	25.3
Curry	13.27	9.81	8.38	7.09	120.2	102.1	92.9	109.2
Douglas	14.47	12.44	11.59	11.50	90.0	110.3	103.8	79.5
Jackson	9.78	6.90	5.85	5.51	50.5	39.3	41.2	33.0
Josephine	18.23	11.78	10.04	9.56	119.1	74.4	89.8	63.0
Klamath	2.47	1.85	1.73	1.68	17.3	13.4	13.7	11.7
Lane	3.92	2.91	2.48	2.36	17.1	14.1	13.6	11.6
Lincoln	0.45	0.40	0.33	0.31	3.4	2.5	2.2	1.6
Linn	1.77	1.39	1.37	1.30	9.4	8.2	8.5	7.1
Marion	0.62	0.43	0.39	0.36	2.6	2.0	2.0	1.7
Multnomah	0.13	0.09	0.08	0.08	0.5	0.4	0.4	0.4
Polk	3.91	2.75	2.43	2.41	16.2	13.6	13.1	12.2
Tillamook	1.38	1.14	1.03	0.93	8.2	7.7	6.4	8.7
Washington	0.19	0.13	0.11	0.10	0.8	0.6	0.6	0.5
Yamhill	1.09	0.75	0.67	0.64	4.9	3.7	3.6	3.1
Average	3.01	2.19	2.54	1.81	13.6	10.9	10.9	9.5

[1] Represents county O&C distribution for fiscal year (ending September 30) divided by total assessed value (in thousands) on January 1 of same calendar year.

[2] Represents O&C distribution as percent of total property tax levy for following year, e.g., fiscal 1977 distribution as percent of 1977-78 levy.

Source: USDI, BLM 1978a, 1980e, Oregon Dept. of Revenue 1979, 1980, 1981.

A net of 4 percent of revenues from public domain lands is remitted to State governments. These revenues in Oregon are distributed to counties on the basis of total land areas for the benefit of county roads and bridges. Total revenues from such lands in the EIS area were $858,371 in fiscal 1980, resulting in the distribution of minor amounts among Oregon's 36 counties.

Local Income Attributable to BLM-Administered Lands

In summary, the principal sources of local personal income arising from lands administered by BLM in the EIS area are:

Timber	$32,233,000
Fishing (including sports)	263,400
Hunting and trapping	59,200
Other recreation	983,000
Total	$33,538,600

Local income from fishing as shown includes income from commercial fishing in other parts of Oregon and Washington which could not be separately estimated. The amounts shown omit the in-lieu tax payments and other BLM-generated revenues accruing directly to the local governments in the area.

Social Concerns

Timber harvesting and processing, as a major economic support of some of the local economies, influences social attitudes and concerns of residents. The current depression in the local economy has raised concern about the timber industry.

The fluctuations of the industry have required people to adjust to changes in their welfare. The expectation of a major reduction in the timber supply (and employment) in one or two decades has increased concern about the timber supply.

The seasonal variations in timber industry employment and the longer fluctuations in employment attributable to market conditions have produced a kind of dual work force in the industry consisting of a core of stable, senior workers and a peripheral group of more mobile workers who shift between the higher-paying timber industry jobs and other employment depending on job availability (Stevens 1976). In the woods, sharp social distinction is drawn between workers in logging and those in activities related to reforestation. Pay scales differ widely between these groups, and an unemployed logger would be very unlikely to accept a lower-paying reforestation-related job.

A recent statewide survey by Bardsley and Haslacher (Harris 1979) showed that residents of the Portland metropolitan area and the Willamette Valley have desires concerning the use of Federal lands similar to people in Oregon as a whole. The majority of those surveyed favored increased wildlife habitat, hiking and camping, and hunting and fishing, and less use of off-road vehicles and snowmobiles. Survey respondents also showed a preference for more wilderness and for more timber production. These survey results are shown in Table 2-20.

Herbicide use is a controversial issue having many vocal advocates and opponents. Advocates believe it is an economically practical and safe means of increasing timber production by controlling competing vegetation when used with proper safeguards. Opponents believe further evidence is needed to prove that herbicide use is less expensive than other means. They also believe herbicide use may be damaging to the environment and harmful to human health.

Table 2-20 Changes Desired by Survey Respondents in the Use of Federal Lands
(Percent distribution, undecided respondents not shown)

	Oregon			Metro Portland			Willamette Valley		
Use	More	No Change	Less	More	No Change	Less	More	No Change	Less
Wildlife habitat	61	30	8	63	30	5	62	31	5
Hiking/Camping	52	38	8	54	39	5	53	35	10
Wilderness	44	38	16	50	39	9	44	40	14
ORVs/Snowmobiles	13	24	60	12	21	64	13	23	61
Timber production	41	38	19	33	46	18	40	36	22
Hunting/Fishing	51	40	7	50	36	12	52	40	7

Source: Harris 1979.

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

CHAPTER 3 ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

In this chapter, environmental consequences (impacts) are compared to the existing situation, as described in Chapter 2. Economic impacts are based on the existing situation plus projections of price and revenue levels under Alternative 7 (No Action). The significant impacts resulting from implementation of the alternatives are analyzed in relation to these baselines. A tabular comparison of composite impacts from each alternative is shown in Table 1-5. Analysis, including the scoping process, indicates that there would be no significant impacts upon climate, geology, topography, minerals, grazing, agriculture, utilities, communication sites, paleontological sites and wilderness. Therefore, these topics are not discussed.

The major actions which cause impacts are timber harvest, road construction, site preparation (includes slash burning and herbicide use), animal damage control, plantation maintenance and release, precommercial thinning and fertilization. Significant effects to the local area and its economic base can also occur depending upon which alternative and harvest volume levels are ultimately selected. These would include changes in employment, personal income and sharing of sale receipts with county governments, school districts and other local taxing entities.

In analyzing the impacts of the new preferred alternative, a sample 5-year (1984-88) timber sale plan (available for review at the Salem District Office) was developed and used, where applicable, to assess potential site-specific timber sale impacts. Although a 5-year plan is used for analysis purposes, it is considered typical for the entire decade. Possible conflicts identified in this chapter for specific sales will be thoroughly addressed in detailed site-specific environmental assessments. Timber management treatments not included in the timber sale plan (brushfield and hardwood conversion, planting, vegetation control with herbicides, animal damage control, precommercial thinning and fertilization) are analyzed at the proposed 10-year levels. Site-specific environmental assessments will be prepared when specific acreages are identified for each treatment. Analysis of the alternatives is based on the different levels of treatments shown in Table 1-2.

Two time frames are used in the analysis process. The short term is the first 10 years following the adoption of a new timber management plan. The long term is defined as beyond 10 years. Other time periods pertinent to specific impact discussions are used as necessary and identified in the text. Analysis of long-term impacts for all alternatives is based on the assumption that the alternatives would be continued for many decades. In fact, the 10-year timber management plan and related land use allocations selected after completion of the EIS will be subject to revision at the end of one decade.

A basic assumption of the analysis is that sufficient funding and personnel will be available for implementation of the final decision.

IMPACTS ON AIR QUALITY

During the next decade, the major impact on air quality from BLM timber management activities would be visible smoke from slash burning. Estimated levels of burning activity by alternative are depicted in Table 1-2 (Treatments, Site Preparation, Broadcast Burning). Compared to the existing situation (Alternative 7), burning would increase by 530 acres per year under Alternative 1 and decrease by 280 acres per year under Alternative 4.

Regardless of the alternative selected, all burning would be done in accordance with the Oregon Smoke Management Plan. Normally, smoke would be carried into upper air levels and away from populated areas. Occasionally, unforecasted weather changes could cause some smoke to return to surface areas, causing relatively brief visible intrusions in nearby residential areas. The probability of intrusion would be highest under Alternative 1, due to more acres burned, and lowest under Alternative 4.

Past experience indicates that visible intrusions in residential areas are not likely to occur from BLM burning in the SYUs during the decade.

IMPACTS ON SOILS

The major impacts of timber management on soils are compaction, landsliding, topsoil removal and depletion of organic matter, nitrogen and other nutrients. Each results in a loss of soil productivity (see Glossary). These impacts are derived primarily from road, fire trail and landing construction; yarding logs; scarification and slash burning.

Several measures would be employed to minimize adverse impacts on soils where feasible. Compacted soils would be tilled to partially restore productivity; partial and total suspension yarding systems would be used to minimize loss of soil productivity; new roads would be located on ridgetops, made narrow and designed to avoid undercutting or overloading unstable slopes; excess road material on unstable and potentially unstable slopes would be end-hauled to reduce landsliding; scarification would be done without piling soil; and slash burning and scarification would be avoided on thin, droughty (see Glossary) or nitrogen-deficient soils.

Table 3-1 shows estimated acres upon which soil productivity would be lost as a result of timber management under the alternatives during the first decade.

Soil compaction results primarily from the weight and shearing forces involved in dragging logs and operating ground-based logging equipment. Compaction hinders root penetration, reducing vegetation growth potential. Decreases in root penetration of 35 to 65 percent can reduce the vegetative productivity of soils by 10 to 25 percent (Power 1981a). Yarding systems using ground-based equipment have a higher impact on soils than cable systems which drag the logs. Systems using total suspension have the least impact on soils.

Land scarification by tractors with brush rakes compacts soil and displaces topsoil. This practice can be expected to reduce soil productivity by 11 to

Table 3-1 Estimated Acres Lost from Production During First Decade

	Acres Lost from Production, by Alternative								
Processes	OPA	1	2	3	4	5	6	7	8
Road Construction[1]	771	828	776	743	685	771	771	805	729
Compaction[2]	400	479	294	470	155	573	443	465	476
Dry Ravelling[2]	307	340	292	300	228	325	305	330	289
Debris Avalanches[2]	30	31	30	30	25	30	30	32	30
Debris Torrents[2]	70	70	70	70	65	70	70	74	70
Slump-earth Flows	acreage data unavailable								
Nutrient Depletion	acreage data unavailable								

[1] From Table 2-1.

[2] Data represent equivalent net acres, calculated by taking the percentage of production loss from each process and multiplying it by the acres to be impacted by each process.

Source: Power (1978, 1981b).

22 percent (Clutter and Dell 1978). One study in the Salem District showed a reduction of 17 percent in productivity after scarification (Power 1981c). Topsoil is also removed by dragging logs and by constructing fire trails, roads and landings with heavy equipment.

Natural variability in parent materials (see Glossary) and soils forming from them result in slopes having different potentials for dry ravelling and landsliding (mass movement). These processes occur in the SYUs primarily on slopes greater than about 65 percent. Landsliding on steep slopes includes debris avalanches and torrents.

Dry ravelling is active throughout the year in the SYUs and results in decreased soil depth and loss of topsoil. Vegetative cover controls this process by trapping soil. When vegetation is removed by yarding logs, slash burning or other practices, trapped materials move and ravelling is accelerated. On steep, south-facing slopes this process may continue for 20 to 30 years after disturbance where vegetation does not become fully reestablished.

Power (1981c) found that under natural conditions, soil movement from dry ravelling averaged .006 inch/year on slopes of approximately 65 percent. Soil movement from ravelling can increase by more than 30 times the natural amount following road construction. Similar ravelling rates can be expected in cable skid roads on slopes greater than 65 percent, resulting in the loss of approximately 4 to 6 inches of soil depth over a 20- to 30-year period. Removal of topsoil and reduction of 15 to 25 percent of soil depth will decrease soil productivity by as much as 45 percent (Power 1981d).

Debris avalanches in the SYUs are triggered by sidecasting of road materials, road fill failures, yarding logs and diversion of water from roadk. Swanston and Swanson (1976) reported that, compared to undisturbed forest, average soil loss from debris avalanches was nearly three times greater as a result of clearcutting and 146 times greater as a result of road construction.

Debris torrents typically involve the rapid movement of water-charged soil, rock and organic material down steep stream channels. They are often triggered by debris avalanches but also by road failures and by partial and no-suspension cable yarding. One study showed that, on the average, debris torrent erosion increased nearly seven times from clearcuts and nearly 88 times from roads, compared to undisturbed forest (Swanston and Swanson 1976). Similar erosion rates can be expected in the SYUs.

Slump-earth flows (see Glossary) often occur in areas with poorly drained parent materials. They occur naturally, but timber management practices can increase or retard their movement by overloading, undercutting and/or changing subsurface water flows on unstable slopes. The amount of land subject to slump-earth flows has not been identified in the SYUs except in the most fragile areas. Considering only differences in harvest levels, slump-earth flows would be expected to occur most frequently under Alternative 1 and least frequently under Alternative 4.

Soil fertility (capability to produce plant growth) is strongly dependent upon a soil's organic matter and nitrogen content. Any disturbance that reduces the vegetative cover, duff layer or soil itself will reduce organic matter and nitrogen. Scarification and practices which increase dry ravelling are major factors responsible for the removal of duff layers and topsoil. Slash burning removes vegetation and duff and directly depletes total nitrogen in topsoil. In areas where burning is of high intensity, as much as one-half of the total nitrogen in the top 1 inch of soil may be depleted. While available nitrogen may temporarily increase, severe total nitrogen deficiencies can result, reducing soil fertility (Power 1981e).

The severity of long-term adverse impacts on soil productivity is related to amount of acres harvested, logging systems employed, miles of road constructed and protection given fragile sites. Alternative 4 would have least impact due to fewest roads and harvest units, maximum use of total suspension logging systems and either avoidance or strict control of surface-disturbing activities on fragile sites. The highest impact would occur under Alternative 1, which allows road construction and/or timber harvest on 81 percent of BLM-administered land. Compaction, topsoil removal, landsliding and fertility loss would be severe under this alternative.

Approximately 8,200 acres are scheduled for harvest in the sample 5-year timber sale plan. This includes 50 acres of severely fragile lands, 400 acres of moderately fragile lands and 5,150 acres of slightly fragile lands. Soil productivity would be temporarily or permanently lost on an estimated 1,100 acres of land in the SYUs as a result of timber management activities during this 5-year period. Soil productivity would be partially restored on approximately 700 of these acres through tillage, though only 50 percent restoration can be expected. The net result, after mitigation, would be equivalent to a total loss of soil productivity on approximately 750 acres of land.

Conclusions

Impacts to soils from compaction, topsoil removal, landslides and nutrient depletion would occur under all alternatives, resulting in an irretrievable loss of some soil productivity. Adverse impacts would be greatest under Alternative 1 and least under Alternative 4.

IMPACTS ON WATER RESOURCES

Forest management activities which would impact water resources include road building, timber harvest, slash burning and application of fertilizers and herbicides. These activities can affect water yields, seasonal streamflow characteristics (peaks and low flows), sedimentation and instream water quality (temperature, dissolved oxygen, nutrients and organic substances). The magnitude of each impact would depend upon the amount of timber harvested in each watershed, the proximity of the activities to streams, and the site-specific application of mitigating measures. Mitigation to be applied may include falling timber away from streams, equipment restrictions and seasonal logging restrictions.

Forest harvest activities would have very little effect on the streamflow of larger rivers draining the SYUs. Table 3-2 shows estimates of annual water yield from public lands in the SYUs for each alternative, compared to the existing yield.

Table 3-2 Estimated Annual Water Yield
From BLM-Administered Land, End of First Decade

Situation	Annual Water Yield (acre-feet) [1]	Percent Change From Existing
Existing	897,320	--
Original Proposed Action	890,312	-0.8
Alternative 1 (Max. Tbr.)	899,267	+0.2
Alternative 2 (Emp. Tbr.)	891,312	-0.7
Alternative 3 (Mod. Tbr.)	890,625	-0.7
Alternative 4 (Emp. Other)	883,143	-1.6
Alternative 5 (Acc. Tbr.)	892,566	-0.5
Alternative 6 (No Herb.)	889,316	-0.9
Alternative 7 (No Action)	890,802	-0.7
Alternative 8 (NPA)	890,800	-0.7

[1] Estimates of water yield are based on recorded and projected harvest levels and were calculated using the water yield increase analysis procedure developed by the U.S. Forest Service (USDA, FS 1974b).

Although the effect of timber harvest on streamflow in the larger rivers would be small, local increases in water yield would occur in clearcut areas. Removing forest vegetation reduces evapo-transpiration (see Glossary), thereby increasing the amount of rainfall available for streamflow. Studies of clearcutting small watersheds in western Oregon showed that water yields from clearcut areas increased 26 to 43 percent following harvest (Harris 1977; Rothacher 1970; Harr et al. 1979). Based on Rothacher's (1970) study of clearcutting in the central Oregon Cascades, water yield from clearcut areas in the SYUs is expected to increase 35 percent. The duration of increased water yields is not easily predicted; however, varying degrees of altered yields may last up to 35 years (Kovner 1956, Cited In Harr et al. 1979).

In addition to altering total annual water yields, timber harvest would affect the timing and magnitude of seasonal streamflows in small watersheds in the SYUs. Rothacher's (1970, 1973) study of small watersheds near the SYUs showed fall and spring peak flows were increased by logging, although extreme winter peaks were relatively unaffected. A recent analysis (Christner 1981) suggests that extreme winter peaks may also be increased by timber harvest if the peaks occur from heavy rainfall on an existing snowpack. Summer low flows would also be increased by timber harvest. Studies of other small watersheds in the central Oregon Cascades (Rothacher 1971) suggest minimum flows for small watersheds in the SYUs would increase up to 300 percent. Although relative changes in minimum flows may be large (200 to 300 percent), absolute changes would be small, due to naturally low levels of streamflow during the summer months. Increases in peak and low flows would be greatest in those small watersheds sustaining the greatest increases in clearcut acreages during the next decade (e.g., Dead Horse Creek).

Timber harvesting, road building and slash burning would increase sediment discharge from affected small watersheds in the SYUs. Fredriksen and Harr

(1979) reported that logging in the central Oregon Cascades increased suspended sediment yield 23 times the natural rate (undisturbed conditions) in a patch cut watershed with roads, and nine times the natural rate in a clearcut watershed without roads. Similar increases in sediment yield can be expected in small watersheds within the SYUs where mass soil movement (debris avalanching) is the dominant erosion process (see Chapter 3, Impacts on Soils). In undisturbed watersheds, streams are usually capable of transporting more sediment than is delivered to them (Rice et al. 1979). Following timber harvest, road construction and slash burning, an overabundance of sediment and debris would be delivered to drainage systems. Sediment discharge would then no longer be determined by the availability of sediments, but by the transporting ability of streams. Where stream energy is insufficient to transport all the sediment, deposition would occur.

Estimates of annual sediment yield for the SYUs are presented in Table 3-3. Estimated changes in sediment yield relative to existing yields vary from an increase of 4 percent under Alternative 1 to a decrease of 10 percent under Alternative 4. While variation between alternatives is small, estimated total yields represent approximately three times the rate for undisturbed watersheds.

Table 3-3 Estimated Annual Sediment Yield
From BLM-Administered Land, End of First Decade

Situation	Annual Sediment Yield (tons)	Percent Change From Existing
Existing	24,802	--
Original Proposed Action	23,815	-4.0
Alternative 1	25,720	+3.7
Alternative 2	24,027	-3.1
Alternative 3	23,865	-3.8
Alternative 4	22,265	-10.2
Alternative 5	24,285	-2.1
Alternative 6	23,607	-3.5
Alternative 7	23,938	-1.9
Alternative 8	23,891	-3.7

The chemical quality of surface water would be affected by slash disposal. In one Oregon Cascades watershed studied by Fredriksen (1971), instream concentrations of ammonia-nitrogen and manganese reached peak levels of 7.6 and 0.44 parts per million (ppm), respectively, following slash burning. Fredriksen attributed the high concentrations of ammonia-nitrogen and manganese to burned slash in stream channels. In the SYUs, all alternatives except 1 would provide adequate protection for larger streams (third order and larger) to prevent burned slash from entering stream channels. Only Alternative 4 would provide adequate protection from slash burns for all second order streams. None of the alternatives would protect first order streams from slash burns. Ammonia-nitrogen and manganese concentrations could exceed recommended water quality standards (0.02 ppm for free ammonia-nitrogen, 0.05 ppm for manganese) in some first order streams for several days following slash burning. However, water from these streams would quickly be diluted upon entering second order or larger streams. Substantial increases in nutrient concentrations following forest fertilization are not expected in the SYUs.

Timber harvest affects stream temperatures by removing shading vegetation from streambanks. Stream temperature increases of 10° F or more have been recorded following removal of streamside vegetation by clearcutting and burning in both the Oregon Cascades and Coast Range (Brown and Krygier 1970; Levno and Rothacher 1967). None of the alternatives provides temperature maintenance for first order streams. Under Alternatives 1, 2 and 7, removal of riparian zone vegetation on second order and larger streams would affect water temperatures. Because downstream shading does not significantly lower temperatures of streams warmed by upstream exposure (Brown et al. 1971), temperatures of larger streams in the SYUs would increase when small tributaries are exposed by clearcutting.

Harvest activities may reduce instream concentrations of dissolved oxygen by adding debris to streams. Fine organic debris (such as small twigs and needles) uses dissolved oxygen during decomposition. This depletes dissolved oxygen concentrations at times of high stream temperatures, low streamflows and low available oxygen. Since instream oxygen concentrations quickly return to normal following stream cleanout and fall rains (Hall and Lantz 1969), low instream oxygen concentrations would only be local and temporary in the SYUs. However, oxygen concentrations in stream gravel may continue to decline for several years after logging, because water flow through gravels is restricted by sedimentation (Hall and Lantz 1969). For this reason, impacts on intragravel oxygen in the SYUs will be directly related to the changes in sediment yield already discussed.

The effects of herbicide application on water quality have been described elsewhere (USDI, BLM 1978b). Design elements (see Chapter 1) such as buffer strips are expected to reduce herbicide drift or accidental direct spraying of water bodies. Amounts of herbicide reaching streams beyond these barriers would be insignificant and would not adversely affect water quality. Movement of herbicides through the soil (leaching) is relative, and is usually measured in terms of inches or a few feet (Norris 1975). This is a slow process that would not lead to stream contamination, because the herbicide would degrade before reaching free water (Ibid). For additional discussion, see Chapter 3, Impacts on Animals and Chapter 3, Impacts on Human Health.

Table 3-4 lists acres of BLM-administered land in municipal watersheds that would be harvested under the sample 5-year timber sale plan. Nothing in the sample plan is expected to affect the quality of these streams as municipal supply sources.

Table 3-4 BLM-Administered Lands in Municipal Watersheds Proposed for Harvest in the Sample 5-Year Timber Sale Plan

Water District	Water Supply	Acres Proposed for Harvest
Albany	So. Santiam River	1,807
Canby	Molalla River	1,775
Clackamas	Clackamas River	1,214
Colton	Jackson Creek	18
Corbett	Gordon Creek	502
Estacada	Clackamas River	620
Gates	No. Santiam River	0
Lebanon	So. Santiam River	1,807
Lyons/Mehama	No. Santiam River	305
Mill City	No. Santiam River	0
Milwaukie	Clackamas River	1,214
Molalla	Molalla River	1,587
Oregon City	Clackamas River	1,214
Portland	Bull Run River	0
Salem	No. Santiam River	305
Sandy	Alder Creek	54
Silverton	Abiqua Creek	117
Silverton	Silver Creek	0
Stayton	No. Santiam River	305
Sweet Home	So. Santiam River	1,660

Conclusions

Except for small changes in total sediment yield, all alternatives would have very little effect on the water quality of larger streams draining the SYUs.

Increases in stream temperatures, water yields, peak and low flows, and decreases in dissolved oxygen would occur within some small watersheds following timber harvest. Overall increases would be greatest under Alternative 1 and least under Alternative 4.

IMPACTS ON VEGETATION

Terrestrial Vegetation

Timber management would have widespread impacts on terrestrial vegetation of the SYUs. Both target and nontarget vegetation in areas scheduled for timber management would be directly affected by road building, timber harvest and treatments. Offsite vegetation would receive secondary impacts. The degree to which existing and future vegetation would be affected would depend on the intensity of each management treatment (see Table 1-2).

Transportation Systems

Sites designated for permanent use as roads, landings, rock storage areas, rock pits and quarries would not support vegetation and would therefore represent irreversible losses of habitat. During the coming decade, vegetation eliminated by road construction is expected to vary from 685 acres under Alternative 4 to 828 acres under Alternative 1 (see Table 1-2). Blasting, excavation, operation of tracked and wheeled vehicles, and the spreading or dumping of excess excavation material and woody debris will kill or injure some vegetation. Soil disturbance resulting from such activities creates an altered environment usually colonized by grasses, forbs and other low vegetation. Occasionally such areas are seeded with non-native species in attempts to reduce erosion. All of the above-mentioned practices disrupt vegetation. The impacts are long term but local in extent.

Timber Harvest

Timber harvest would result in widespread and long-term impacts on the vegetation of the SYUs. Harvesting alters existing vegetation and affects future plant communities. Acres that would be affected by harvest range from 10,822 under Alternative 4 to 20,865 under Alternative 1.

In the process of felling and removing merchantable trees, damage to remaining trees and understory vegetation results from crushing, uprooting, cutting or burying. This may lead to increased susceptibility to disease, pests or fire damage. The effects of logging on species composition and the progression of plant communities vary according to cutting and yarding practices. In most cases, impacts from yarding are temporary. Overstory removal and soil disturbance are major habitat modifications.

Harvesting creates openings in the forest canopy which vary from a few feet in diameter (partial cuts) to many acres in size (clearcuts). Small openings formed during commercial thinning and mortality salvage operations lead to changes in the growth rate and relative abundance of species present. Overstory trees and species intolerant to shade generally show increased vigor. Pioneer species may colonize disturbed ground, initiating secondary succession (see Glossary) within the stand.

Clearcuts and partial cuts essentially represent conversion of second growth, mature and old-growth conifers to early successional stages. Changes in age class distribution for each alternative are displayed in Appendices F and I.

Continuation of intensive timber management would not allow future forest stands within the Intensive Timber Production Base (see Table 1-2) to achieve old-growth status (196+ years). An analysis of computer cut runs for each alternative shows that the oldest stands present in the intensive management base at the end of the 40-decade projection period range from 60 years for Alternative 1 to 130 years for Alternatives 3 and 4. Consequently, some plant species associated with older age timber stands could be permanently excluded from intensively managed forest lands. In addition, younger age classes exhibit simpler structure. They contain fewer species and less variety in height, age and distribution of plants.

Treatments

Vegetation, slash and/or the condition of the ground surface at selected sites is commonly altered to reduce fire hazard and to expedite reforestation. In the process, existing vegetation is destroyed or damaged, and subsequent regrowth reflects changes in micro-climate and site characteristics. As slash and vegetation are chemically treated, burned or rearranged into piles, available shade is reduced and mineral soil is exposed. Such conditions favor pioneer and shade intolerant species, but reduce habitat for others.

Broadcast burning is the most frequently used method of site preparation (see Table 1-2). Impacts depend on the severity of individual burns. Past research (Cramer 1974) indicates about 6 percent or less of a treated area is severely burned, and 55 to 75 percent is lightly burned. Lightly burned acres have a higher percentage of herbaceous and brush cover within the first 2 years after burning. Most of the harvested acreage in the SYUs would be lightly burned or unburned.

Burning can suppress fast-growing shrubs, such as salal or vine maple, which compete with commercial tree seedlings. It can also stimulate regeneration of forbs and shrubs, especially ceanothus. Availability of mineral soil and lack of competing vegetation enhance both natural and artificial reforestation.

Mechanical site preparation which exposes mineral soil indirectly enhances reforestation on most sites. It directly impacts residual vegetation through root damage, uprooting and crushing. Gross yarding (see Glossary) causes similar damage to vegetation locally, but lessens the likelihood and severity of impacts that could otherwise result from wildfire or broadcast burns that are too intense.

Stand conversion involves the replacement of one plant community with another. It represents a localized change in species composition as well as a shift to the simpler structure and lower diversity associated with young stands, especially conifer plantations. The conversion of brush fields, poor quality hardwoods and young hardwoods (less than 5 inches dbh) growing on former conifer sites is expected to range from 0 acres under Alternative 7 to 476 acres under Alternative 2 (see Table 1-2).

Assuming site preparation is timely and adequate, nursery-grown conifer seedlings are planted in clearcuts the first or second year following harvest. On plantations, conifers are numerous in all successional stages. After 10 to 15 years they can dominate other vegetation, precluding the maximum development of plant diversity in transitional plant communities. Since plantings usually consist of one primary species, the resulting forest exhibits a relatively low diversity of tree species.

A relatively new and growing aspect of the reforestation program is use of genetically improved seedlings (see Chapter 1, Forest Management Treatments and Design Features). Planting an estimated 10,319 acres with genetically improved trees during the proposal period would not have a significant effect on the natural gene pool (see Glossary) in either the short or long term. No significant adverse long-term impacts are anticipated with the eventual planting of genetically improved trees on 90 percent of the timber production base acres. Maintaining a broad selection of parent trees and setting areas aside from timber management would ensure variability in genetic base populations.

Herbicides are used to manipulate species composition, density and vigor. Applications are targeted to suppress grass and broadleaf species which would otherwise compete with conifers. Gratkowski and Lauterback (1974) reported on the height growth of young Douglas-fir after herbicide spraying. Percentage increase in height growth over trees in unsprayed stands varied from 130 percent (for trees 1 foot high when spraying occured) to 149 percent (for trees 6 feet high) for basal spray plots and from 255 percent (for trees 1 foot high) to 171 percent (for trees 6 feet high) for aerial spray locations. Although the direct impacts of herbicides are short term, the effects of accelerating the establishment of coniferous stands are long term. Once a coniferous stand becomes dominant, it will remain so until harvested or until insects, disease, fire or other natural forces destroy it.

Nontarget vegetation adjacent to spray units can be adversely affected if herbicides drift beyond spray boundaries. Such impacts are reduced, but not eliminated, by buffer strips and accurate application. For more information on herbicides and the monitoring of their application, see the FEIS Vegetation Management with Herbicides : Western Oregon - 1978 through 1987 (USDI, BLM 1978b).

Precommercial thinning is expected to have minor effects on understory vegetation. The reduced canopy density should stimulate growth of remaining vegetation. Dead saplings on the forest floor would create a fire hazard for a minimum of 3 years.

Selected timber stands would be fertilized following thinning operations. Fertilized acres would range from 9,018 under Alternative 1 to 0 under Alternative 7 (see Table 1-2). Fertilization results in immediate increases in available nutrients for all vegetation on the site. Such effects vary with site quality and last a maximum of 7 years.

Wetland and Aquatic Vegetation

Management prescriptions for known wetlands and adjacent vegetation range from complete protection under Alternative 4 to removal of all commercial trees under Alternatives 1 and 7. Other alternatives would permit partial removal of commercial trees within adjacent vegetation. Timber harvest adjacent to water, or road construction through wetlands, would have adverse impacts on wetland and aquatic vegetation. Significant impacts on plant communities would be caused by increased sedimentation, increased water temperatures, reduced water availability and similar modifications. With the exception of Alternatives 1 and 7, wetland values are expected to be adequately protected.

Sensitive, Threatened and Endangered Plants

Unidentified populations of sensitive, threatened or endangered species could be susceptible to any impacts described under Vegetation. Direct effects of injury or death to plants could cause the immediate elimination of a species throughout all or a significant portion of its range. The more subtle effects of vegetative community changes could cause the eventual elimination of a species on a specific site through loss of competitive ability relative to other vegetation.

If any species of vascular plant is determined by the U.S. Fish and Wildlife Service to be threatened or endangered, any action that would contribute to its extinction or to its threatened or endangered status would be in violation of the Endangered Species Act of 1973 (as amended). Therefore, environmental analysis accomplished prior to any site-specific action would document any threatened or endangered plant species known to be present on the site and identify appropriate measures to be taken to protect the species.

Conclusions

Alterations to the structure and development of plant communities would be the most severe, long-term and widespread impacts of the timber management program. Under intensive timber management, existing older forest communities scheduled for timber harvest would be converted to early successional stage communities. Appendix I shows amounts of old-growth and mature habitat that would be lost.

Vegetation would be altered more often than eliminated, because natural revegetation or plantings would soon restore vegetation to most disturbed sites. Construction of permanent roads would permanently eliminate vegetation. Habitat changes could eventually eliminate certain species from some areas.

Short-term use of commercial forest lands for timber harvest would increase long-term production of wood fiber as old, slow-growing stands are replaced by young, fast-growing stands managed for optimum wood production. In the long term, as the area approaches a balance of age classes, maximum growth of commercial conifers would be achieved. Intensive timber management practices such as planting and herbicide application would favor survival of conifers and would suppress, but not eliminate, hardwood trees, shrubs and herbaceous plants. Diversity and complexity of plant communities would diminish as maximum growth of commercial conifers is emphasized.

IMPACTS ON ANIMALS

Terrestrial Animals

Timber management affects wildlife primarily by modifying habitat. Wight (1974), Meslow (1977) and Thomas (1979) indicated that certain wildlife species are associated with forests of a particular age class and structure. Appendix E lists species occurring in the SYUs and their associations with various habitats. The close affinity of wildlife for particular habitat conditions underscores the importance of analyzing impacts of forest harvesting on habitat composition.

In the following discussion, changes in wildlife habitat conditions are assessed in relation to the composition, distribution and integrity of habitat types (see Chapter 2, Animals). The long-term (fifth decade) composite effects of these three factors under the various alternatives are shown in Table 3-5.

Table 3-5 Probable Changes[1] in Wildlife Habitat
Conditions on BLM-Administered Lands
During Next Five Decades

Habitat Component	Existing Condition[2]	Relative Changes by Alternative OPA,6	1	2	3	4	5	7	8
Grass/Forb - Brush/Seedling (non-stocked to 15 years)	Poor	-	-	-	-	+	-	-	-
Pole/Sapling - 2nd Growth (16-115 years)	Good	-	-	-	-	+	-	-	-
Mature (116-195 years)	Good	+	--	+	+	+	+	-	+
Old Growth (196 + years)	Good	-	--	-	-	0	-	--	-
Hardwood	Poor	0	0	0	0	0	0	0	0
Riparian	Poor	+	--	0	-	++	+	--	+
Habitat Diversity	Fair	0	--	-	0	+	0	-	-

+ = Beneficial - = Adverse 0 = None or Negligible

[1] Primary criteria for determining change ratings are summarized in Appendix I.

[2] Condition ratings reflect the composite effects of impacts on habitat composition, distribution and integrity (See Chapter 2, Animals).

The condition of grass/forb-brush/seedling and pole/sapling-second growth stages would be enhanced under Alternative 4, primarily because there would be fewer impacts from intensive forest management practices. The condition of these stages would decline under remaining alternatives, primarily due to greater use of intensive management practices and to acreage increases (current acreage is already adequate, and acreage increases in one stage would result in acreage decreases in another).

Mature forest habitat conditions would improve under all alternatives except 1 and 7. Conditions would decline under Alternatives 1 and 7 due to acreage reductions and poor distribution.

Old-growth habitat conditions would decline under all alternatives except 4, where better distribution and provision for replacement acres (see Appendix D) would compensate for reductions from existing old-growth levels.

Hardwood habitat conditions would remain similar to the existing situation under all alternatives, because hardwood acres, distribution and integrity would not appreciably change.

Riparian habitat conditions would be enhanced under the original proposed action and Alternatives 4, 5, 6 and 8 due to increased protection. Road and yarding corridor intrusions would be reduced, and higher quality riparian habitat would eventually be available throughout the SYUs. Intrusions in riparian zones would still be allowed under the original proposed action and Alternatives 3, 5, 6 and 8. Road and yarding corridors could temporarily eliminate up to 25 percent of streamside habitat. This would be especially detrimental to wildlife in watersheds with little remaining natural streamside vegetation. Road and yarding corridors could also interfere with migration and travel routes. The condition of riparian habitat would generally decline under Alternatives 1, 2, 3 and 7, with least protection afforded by Alternative 1.

Management prescriptions for wet meadows, dry meadows and talus slopes would range from complete protection under Alternative 4 to allowance for complete removal of commercial tree species under Alternative 1. All alternatives would allow for some disturbance of ecotones based on site-specific analysis. Initial studies conducted in Salem District in 1981 determined that removal of tree cover along the edges of small meadows reduced bird density and resulted in changes in bird species composition. Similar impacts would be expected from alteration of other special habitats.

Alternative 4 would provide the best overall habitat composition, distribution and integrity. Under this alternative, older forest stages would be evenly distributed throughout the SYUs in adequate amounts to ensure the survival of species finding optimum habitat in these stages. In addition, riparian habitat along second order and larger streams would receive complete protection under this alternative. Remaining habitats would provide necessary conditions for diverse wildlife populations. Alternatives 1, 2 and 7 would be most detrimental to wildlife habitat in the SYUs, primarily by reducing the amount and distribution of old-growth habitat while generally increasing already abundant early successional stages. The integrity of early successional stages and riparian habitat would be diminished by widespread use of intensive management practices under Alternatives 1, 2 and 7. The original proposed action and Alternatives 3, 5, 6 and 8 would minimally change existing fair habitat diversity conditions.

Under each alternative, overall habitat composition in the entire Western Cascades area would remain stable despite major shifts on BLM-administered lands (See Appendix F). However, BLM-administered lands are important in maintaining older forest wildlife populations in the Western Cascades foothills, an area dominated by intensively managed forest lands.

Anticipated long-term population changes for selected wildlife species are shown in Table 3-6 for each alternative. Black-tailed deer can adapt to a variety of cover conditions, so abundance is likely to be comparable under all alternatives. Under Alternatives 1, 2 and 7, elk numbers would decline due to reductions in thermal cover, survival cover (see Glossary) and riparian travel routes, and increases in human harassment. More favorable conditions under the original proposed action and Alternatives 3, 4, 5 and 8 would result in increased elk populations. Due to elimination of snags and decadent trees, woodpecker populations would also seriously decline under Alternatives 1, 2 and 7. Impacts on upland game are expected to be negligible under all alternatives, because plentiful habitat in the form of brushy openings and second growth forest would be available. Reductions in old growth under Alternatives 1, 2 and 7 would be extremely adverse to species finding optimum habitat in old growth.

Table 3-6 Probable Changes in Selected
Wildlife Populations During Next Five Decades

	Existing	Relative Population Changes by Alternative						
Animals	Populations	OPA,5,6	1	2	3	4	7	8
Deer	High	0	0	0	0	0	0	0
Elk	Moderate	+	--	-	+	++	--	+
Woodpeckers	Moderate	-	--	--	-	-	--	-
Upland Game	High	0	0	0	0	0	0	0
Old-growth-related Species[1]	Low	-	--	--	-	-	--	-

+ = Beneficial - = Adverse 0 = None or Negligible

[1] See Appendix E for list of species.

During the first decade, elk populations would slightly decline under all alternatives except Alternative 7 which would produce a moderate decline.

The original proposed action and Alternatives 4, 5, 6 and 8 would maintain the viability of all native species on BLM-administered land by retaining adequate amounts of all forest seral stages up to 350 years old and unique, smaller habitat types such as wetlands, wet meadows and dry meadows. In the long term, adoption of Alternative 1 would likely result in the local elimination of species preferring older forest habitat and could result in declines of species preferring the smaller, unique habitat types. Population viability under Alternatives 2, 3 and 7 would be questionable due to minimal protection guidelines for unique habitat and significant reductions in older forest habitat.

Transportation System

New road construction would eliminate vegetation within rights-of-way. The acreage of habitat that would be eliminated is shown in Table 1-2. Wildlife-vehicle collisions would likely increase in proportion to miles of new road constructed. New roads would also likely increase poaching and hunter access, contribute to harassment of wildlife during stress situations (such as times of temperature extremes) and reduce elk use within one-half mile of roads (Perry and Overly 1977; Lyon 1979). Reduction in elk use would depend upon terrain, cover, distance from roads and other factors. Estimates of elk range that would be affected by road construction and use vary from about 55,040 acres in Alternative 4 to 66,560 acres in Alternative 1 (58,240 acres under Alternative 8). Road construction would be most detrimental to wildlife under Alternatives 1, 2 and 7, least detrimental under Alternative 4 and moderately detrimental under the original proposed action and Alternatives 3, 5, 6 and 8. The MFP includes a recommendation to close some roads, if requested by the Oregon Department of Fish and Wildlife, in order to reduce harassment and poaching of big game.

Timber Harvest

Clearcutting would constitute the greatest impact on wildlife habitat during this decade. Acreage proposed for clearcutting is shown in Table 1-2 and Figure 3-1. Size and spatial orientation of clearcuts are important considerations in deer and elk management. Reynolds (1966) found that elk use in Arizona occurred primarily within 600 feet of the boundary between cover and forage areas. This corresponds to a circular forage area of 26 acres (Thomas 1979). However, a Montana study (Lyon 1976) suggested that openings up to 40 acres would be acceptable to elk. Bureau policy limits clearcuts to 40 acres unless economic and environmental considerations dictate otherwise. Spatial orientation refers to the positions of clearcuts in relation to each other. A spatial objective considered in the MFP was to retain tree cover around clearcut units for at least 15 years. This would allow for development of hiding cover (see Glossary) within clearcuts. Analysis of the sample 5-year timber sale plan showed that 18 of the 251 sale units would exceed 40 acres, and 93 units would not meet the spatial criterion described in the MFP. This is expected to be representative of actual sales throughout the decade. Since forage in some new clearcuts would not likely be fully used due to inadequate hiding cover, big game populations would decline in localized areas on BLM-administered lands.

Several beneficial impacts are associated with clearcutting. Forest residues left after logging and subsequent slash burning would benefit wildlife requiring ground cover (e.g., weasels, mountain beaver, winter wrens). Soil disturbance from logging would likely increase forage for deer and elk. Swanson (1970) reported higher elk use on moderately or heavily disturbed sites than on lightly disturbed sites in the southern Oregon Coast Range. However, big game use of forage generally peaks at 6 to 8 years after clearcutting as brush competition reduces the lush grasses and forbs.

Acreage proposed for commercial thinning under all alternatives is shown in Table 1-2. Figure 3-1 shows the projected increase in commercial thinning under the new preferred alternative over the next 10 decades. Commercial thinning would primarily occur in the young second growth stages comprising most of the habitat under all alternatives. Removal of up to 40 percent of the basal area by commercial thinning would significantly and adversely affect wildlife in two ways. First, thinning would reduce forest bird abundance and diversity by simplifying forest structure. MacArthur et al. (1962) showed the importance of maintaining a diverse foliage profile (see Glossary) from forest floor to treetop level. Commercial thinning would eliminate some upper vegetation strata (middle to upper canopy) required by foliage-gleaning

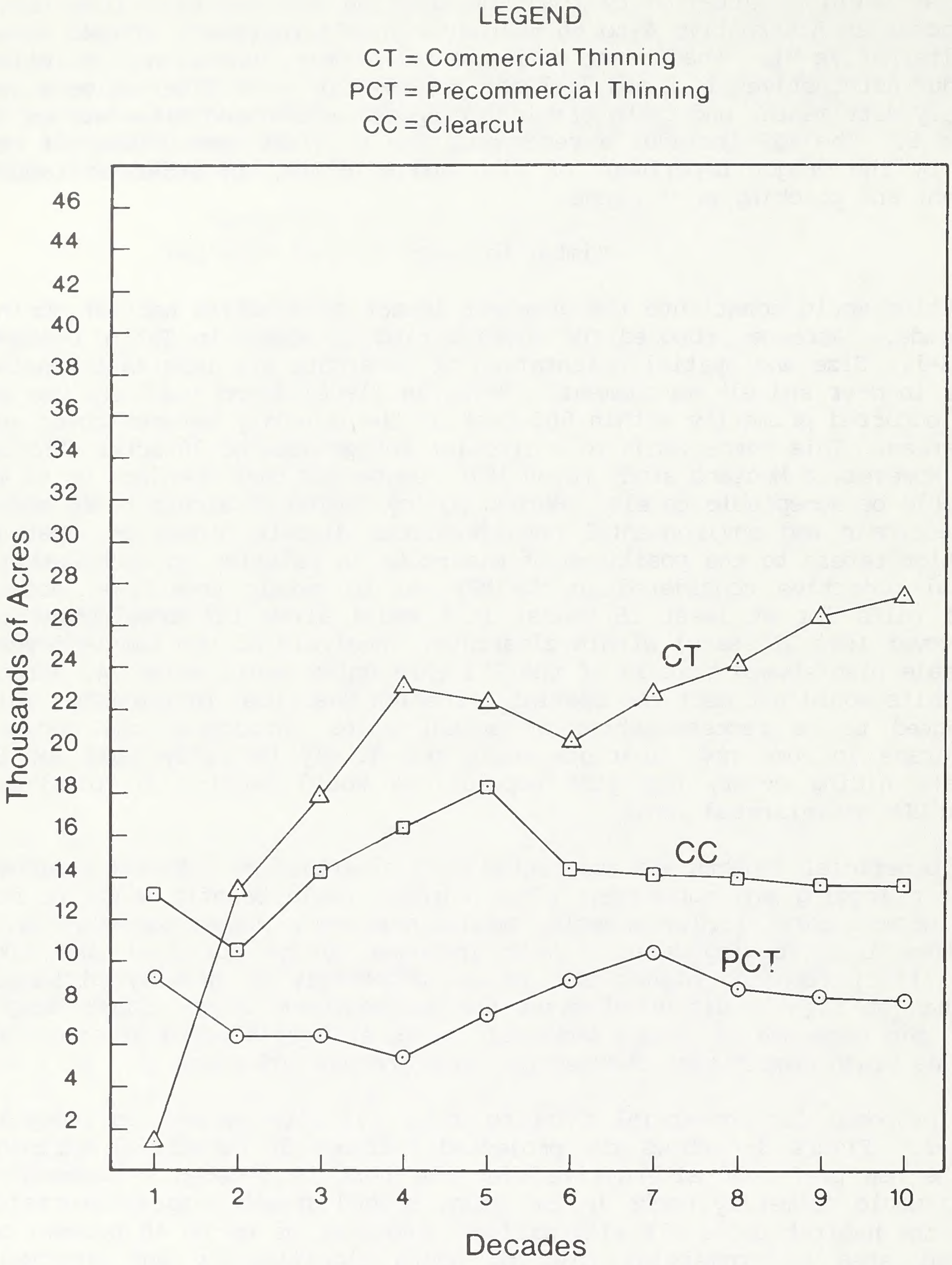


FIGURE 3-1

CLEARCUTTING AND THINNING BY DECADE:
ALTERNATIVE 8 (NEW PREFERRED ALTERNATIVE)

species such as the golden-crowned kinglet and hermit warbler. It would also increase low vegetation required by ground foragers such as juncos and sparrows (Franzreb and Ohmart 1978), although this increase would be limited by shade from remaining trees. Reynolds (1971) showed that Cooper's and sharp-shinned hawks in western Oregon were adversely affected by commercial thinning, since both species require dense second growth forest as their primary nesting habitat. Thinning would also significantly impact wildlife by reducing thermal and hiding cover required by deer and elk (Edgerton and McConnell 1976). Edgerton (1972) found less deer and elk use in partial cut areas (30 percent of basal area removed) than in clearcuts or unlogged stands. Commercial thinning is likely to have slight impacts in the first decade due to the low level of activity. Large increases in thinning acreage after the first decade will have long-term adverse impacts on wildlife.

Treatments

Intensive timber management practices such as precommercial thinning, mortality salvage, slash burning and the use of herbicides are proposed under most alternatives (see Table 1-2 for acreages). Many of these practices would adversely affect wildlife. Impacts would vary according to the amount of acres harvested and treated under each alternative.

Effects of precommercial thinning on wildlife populations have not been extensively studied, but general observations indicate some adverse impacts. Heavy slash accumulations would impede deer and elk mobility, restricting habitat use for up to two decades or until slash decomposed. Precommercial thinning would also diminish the value of densely stocked, young stands as hiding cover for deer and elk and nesting cover for some songbirds (e.g., MacGillivray's warbler). Increased ground cover would benefit some birds and small mammals (e.g., winter wren, rufous-sided towhee, Townsend's chipmunk, chickaree, mountain beaver, weasels). The trend in precommercial thinning under the new preferred alternative over the next 10 decades is shown in Figure 3-1.

Mortality salvage would remove existing snags and eliminate live, decadent trees which would become snags in the future. Recent Salem District surveys revealed that only about 0.2 snags/acre are left on recent harvest units despite the current policy of leaving an average of two snags/acre. (About three snags/acre are required for maximum woodpecker population levels. Leaving two snags/acre would retain 60 percent of maximum population levels.) This already adverse situation is made worse by the fact that few snags are left on adjacent private lands. This trend, if continued, would severely restrict populations of woodpeckers and other cavity-dwelling wildlife (see Appendix E) and could locally eliminate some species such as the pileated woodpecker. BLM would attempt to leave an average of two standing snags per harvested acre, though worker safety and fire protection rules would make this goal difficult to attain.

Impacts of slash burning on ground cover vary with burn intensity. Cooler burns on wet sites would remove less ground cover than hotter burns on dry sites. Removal of small ground cover and charring of larger branches and logs (more than 3 inches in diameter) would be detrimental to some birds (e.g., woodpeckers, chickadees) and to some small mammals (e.g., weasels, rabbits, deer mice) that use forest residues for food or shelter. Charring of large branches and logs would also be harmful to invertebrates, an important link in the food chain. Removal of downed woody material by burning and mortality salvage would cause a long-term reduction of this important habitat in managed forests of the future.

There are several beneficial effects of slash burning. In less than one growing season after burning, grasses and forbs normally grow vigorously, providing habitat for animals adapted to early stages (see Appendix D). Crouch (1974) indicated that slash burning increased the food supply of black-tailed deer. Harper (1969) found higher Roosevelt elk use on burned logging sites than on unburned sites, a difference he ascribed to the greater abundance of grasses on burned areas. However, Harper believed slash burning would not necessarily increase forage on all sites, because each site varies in its response to burning. Burning would also benefit deer and elk by removing obstructions to their use of forage areas (Crouch 1974).

Mechanical piling of slash following scarification could result in soil compaction, damaging subterranean habitat used by burrowing mammals. Piling would remove downed slash that can hinder movements of deer and elk, but windrowed slash could result in large barriers.

Mountain beaver are trapped to reduce damage to young tree seedlings. During the first decade under the new preferred alternative, trapping would be used to control mountain beaver on an estimated 1,900 acres. Nontarget species such as long-tailed weasels, skunks and squirrels comprise about 6 percent of the catch. Eliminating small numbers of nontarget animals by trapping would have localized impacts but would be of little overall significance.

Four major types of wildlife impacts are associated with silvicultural herbicide application: exposure to acute toxic levels, exposure to chronic toxic levels, habitat modification and carrier impacts. A brief discussion of these impacts follows. For more information refer to the final EIS on herbicides (USDI, BLM 1978b).

Newton and Norris (1968) sampled black-tailed deer taken from sites treated with herbicides (2,4,5-T and Atrazine) and were unable to detect residues in most tissues. One animal was found to have a trace of herbicide in its liver. In a study by the herbicide manufacturer, goats given 0.2 mg triclopyr/kg daily for 10 days were found to have tissue residues above the detection limit of 0.003 parts per million (ppm) in only the liver (0.004 ppm) and kidney (0.013 ppm).

Assumming deer consume food at 3 percent of body weight per day, at the hypothetical maximum of 400 ppm of herbicide in browse, intake will be 30 grams feed/kg, or 12 mg herbicide/kg (Dost 1983). In the goat study mentioned above, the maximum herbicide concentration in muscle was between zero and 0.003 ppm. Studies of other species show that tissue concentration is proportional to dose rate. The proportional concentration in the animal's muscle would be 0.18 ppm (0.18 mg/kg), and 0.24 ppm (0.24 mg/kg) and 0.78 ppm

(0.78 mg/kg) in the liver and kidney, respectively. To acquire these dosage levels, an animal would have to forage in freshly treated areas for 10 consecutive days, providing there would be no chemical breakdown or deterioration. Therefore, the potential for wildlife to suffer acute or chronic toxic effects is unlikely at proposed herbicide use rates (see Tables 1-4 and 3-17).

Herbicides significantly modify wildlife habitat. They kill or suppress plants in competition with conifers, reducing vertical and horizontal stratification of vegetation. Wildlife (e.g., MacGillivray's warbler, Wilson's warbler, willow flycatcher, deer, elk) requiring dense, young forests of diverse species would be adversely affected by reduced habitat diversity.

Diesel oil is often used as a carrier for forest herbicides. Data on the toxicity of diesel oil to wildlife are limited, although adult ducks are known to be adversely affected (Hartung 1965, 1966; Tucker and Crabtree 1970). Wildlife would not likely consume lethal amounts of the carrier because of the dilution factors involved. The carrier may, however, adversely affect forage palatability.

All alternatives except 6 call for herbicide use in site preparation and conifer release. The original proposed action and Alternatives 1, 2, 3, 5 and 8 would have the greatest adverse impacts on wildlife. Herbicide use would have a moderately adverse impact on wildlife under Alternatives 4 and 7.

Fish

Timber management activities can impact fish and aquatic habitat by causing changes in the abundance and/or condition of bottom materials, woody materials, streamflows, food sources, water temperatures, channel configuration, fish passage and water chemistry. Chapter 3, Impacts on Soils and Water Resources, provides data on existing and expected amounts of sediments, organic matter and streamflows in the SYUs. Many analyses and conclusions appearing in this section are based on those data.

To avoid or minimize timber management impacts on aquatic habitat, the Bureau employs a number of protection and mitigation measures. Buffer strips (see Glossary), stream cleaning, equipment restrictions and habitat improvement projects are typical of past efforts. If needed and technically feasible, impacts of roads at stream crossings and on fragile sites would be mitigated by designing road crossings perpendicular to streams; rip-rapping stream banks; selecting sites with flattest gradients; limiting road widths; hauling away, rather than sidecasting, excess materials; constructing roads on solid ground rather than fill material; and providing adequate drainage. The alternatives provide a wide range of protection and mitigation possibilities. For example, Alternative 4 is most protective, allowing no riparian zone disturbance on second order and larger streams. Least protective is Alternative 1, which provides for brush, hardwood and in some cases, coniferous vegetation in streamside buffers.

Table 3-7 shows changes in coldwater fish habitat that are likely to occur under the alternatives.

Table 3-7 Probable Changes in Fish Habitat Conditions During Next Five Decades

Habitat Factors	Existing Habitat Conditions[1]	Relative Changes by Alternative OPA,5,6,8	1	2	3	4	7
Bottom materials	Fair	+	-	0	+	+	0
Woody materials	Poor	+	0	0	+	++	-
Streamflows	Fair	0	-	0	0	+	0
Food production	Fair	+	--	0	+	++	-
Water temperature	Fair	+	-	0	+	++	-
Channel configuration	Fair	+	-	0	+	+	-
Fish passage	Fair	0	-	0	0	+	0
Water chemistry	Good	0	-	0	0	0	0
All	Fair	+	-	0	+	+	-

+ = Beneficial - = Adverse 0 = None or Negligible

[1] Subjective estimates based on comparisons with undisturbed streams and riparian zones.

Bottom material (boulders and gravel) with a minimum of sediments (see Glossary) is essential to the health of fish populations. In the SYUs, excessive amounts of sediment in fish habitats result from natural events such as landslides, but are mainly caused by surface disturbing activities near water (see Chapter 3, Impacts on Soils and Water Resources). Excessive sediments directly affect fish by reducing aquatic food sources and by cementing or covering gravel. This reduces dissolved oxygen and eliminates or reduces spawning, incubation and rearing of young fish. According to Gibbons and Salo (1973), excessive sediments have the greatest impact of all factors affecting aquatic life.

Under Alternative 4, sedimentation would be reduced by maximum protection of fragile soil areas and by retention of riparian zones on all second order and larger streams. Alternative 1, which has minimal provision for undisturbed buffers, would increase sediments compared to present levels. Therefore, fish populations would be expected to decline. The original proposed action and Alternatives 2, 3, 5, 6, 7 and 8 would be less protective of fragile soils and riparian zones than Alternative 4, but would not increase sediments over present levels except in some localized stream reaches.

In the SYUs, large trees fall into streams, and many of those remaining in channels provide needed habitat for fish. When large trees (primarily conifers greater than 100 ft. in height) in riparian zones are removed by logging, sources of instream woody structure are reduced. As structure is reduced, gravel deposits, pools, escape cover (see Glossary) and bank and channel stability diminish. Under these conditions, fish populations decline. All alternatives except 1 provide varying degrees of riparian zone protection, thereby assuring a continual replenishment of structure in streams inhabited by fish. Under Alternative 1, which makes no provision for riparian zone protection, woody structure would decline to the detriment of fish populations.

Aquatic and terrestrial invertebrates (mainly insects) are the major food sources for young salmon and trout. According to Erman et al. (1977), buffer strips at least 30 meters (about 100 feet) wide on each side of streams are required to maintain insect populations. Insects falling from multistoried vegetation are widely dispersed over adjacent water, providing a constant and plentiful source of food. Repeated road crossing failures cause significant disruptions to invertebrate communities, according to the same research. The greatest reductions of food sources due to removal of large trees in riparian zones would occur under Alternatives 1 and 7.

Water temperatures are critical for optimum fish production. Reduction of riparian zone vegetation in the SYUs has increased summer and decreased winter water temperatures, thereby reducing fish populations. High summer water temperatures can lower dissolved oxygen, increase the incidence of fish disease, block upstream fish passage, overcrowd juvenile rearing areas and reduce food production. Low winter water temperatures can slow egg incubation. The greatest reductions in water temperatures due to reduced riparian zone vegetation would occur under Alternatives 1 and 7.

Channel configurations (pool/riffle ratio, pool quality, stream depth and stream width) have changed to the detriment of fish populations in the SYUs. This change has affected fish through elimination of space and cover used by young fish and adult resident fish (Reiser and Bjornn 1979). Impacts on channel configurations due to removal of large trees in riparian zones would be greatest under Alternatives 1 and 7.

In the SYUs, landslides and excessive logging debris in streams have reduced fish populations by blocking fish passage and lowering water quality (particularly dissolved oxygen). None of the alternatives are expected to add excessive amounts of logging debris to streams. Under all alternatives, landslides from old and new roads would cause short-term fish passage impacts.

The chemicals proposed for use in vegetation control, at their levels of application, are not expected to significantly affect fish or their habitat. Proposed application rates are well below known lethal doses for laboratory tested species, and toxic effects are not expected. Streamside vegetation that provides shade could be altered, but this is unlikely due to the protection of buffer strips (see USDI, BLM 1978b for more detailed information). Impacts on fish from chemical applications are expected to be similar under all alternatives.

The condition and trend of individual habitat components have a direct bearing on fish populations. If all components are adequately protected, fish populations will be maintained and will probably increase over existing levels. If one or more components are severely impacted, fish populations will remain below potential levels.

Table 3-8 shows relative changes in trout and salmon populations anticipated under the alternatives.

Table 3-8 Probable Changes in Coldwater Fish Populations During Next Five Decades

Species	Existing Population Levels 1/	Relative Changes by Alternative OPA,5,6,8	1	2	3	4	7
Cutthroat	Moderate	+	-	0	0	++	-
Steelhead	Moderate	+	-	0	+	+	0
Chinook	Moderate	0	-	0	0	+	0
Coho	Low	+	-	0	+	+	0
Sockeye	Low	0	0	0	0	0	0
All	Moderate	+	--	0	0	++	0

+ = Increase - = Decrease 0 = None or Negligible

1/ Subjective estimates based on comparisons with the amount of fish streams could be expected to support if habitats were maintained in undisturbed condition.

Under existing conditions, streams in the SYUs are considered to be producing fish at 57 percent of potential levels. The original proposed action and Alternatives 4, 5, 6 and 8 would increase fish production to between 60 and 75 percent of potential by the fifth decade. Fish production would remain nearly the same under Alternatives 2, 3 and 7 and would decrease to 20 percent of potential under Alternative 1.

Analysis of the sample 5-year timber sale plan indicates approximately 5 miles of road would be built on fragile or unstable soils adjacent to streams with fishery values. This could cause increases in sedimentation, resulting in significant adverse impacts to adjacent and downstream fish habitat. New roads in the sample 5-year timber sale plan would cross 97 streams with fishery values. Twenty-five roads would cross headwall areas, possibly causing local short-term and long-term adverse impacts. Approximately 20 miles of streams supporting fish run through or adjacent to 78 harvest units outlined in the sample plan. Since riparian zones would be protected, these streams are not likely to be significantly impacted.

Threatened and Endangered Animals

Threatened and endangered species receive protection under terms of the Endangered Species Act of 1973 (as amended) and BLM policies and guidelines. Analysis of impacts on these species is restricted to the northern spotted owl, because data on the existence of other threatened and endangered species are limited. Present data indicate no impacts on other threatened and endangered species. Future timber management EAs will consider impacts to other threatened and endangered species and identify measures to protect their habitat.

Transportation System

Construction of new roads could adversely affect the spotted owl by eliminating habitat and increasing human disturbance in previously inaccessible areas.

Timber Harvest

Habitat modifications caused by clearcutting would have long-term adverse impacts on old-growth-dwelling species. The northern spotted owl, a State-listed species, is dependent on old-growth closed-canopy forests and would be greatly affected. The original Oregon Endangered Species Task Force management recommendations for each pair of owls (in effect during the preparation of the MFP) called for total protection of a 300-acre old-growth core area (if available) and an additional 900 acres to be managed such that at least 50 percent of this acreage would occur as stands of 30+ year-old forests. The number of spotted owl locations that would be protected under these recommendations in the short and long term are shown in Table 3-9.

Table 3-9 Number of Spotted Owl Locations Protected
Based on Previous and Proposed Revised Recommendations[1]

	Locations Protected			
	300+900 acres/location		1,000 acres/location	
Alternative	1st Decade	5th Decade	1st Decade	5th Decade
OPA,5,6	10	13	2	5
1	0	0	0	0
2	5	7	0	2
3	10	13	0	3
4	9	12	0	8
7	1	2	1	2
8	7	9	3	6

[1] Five owl locations on BLM-administered land in the SYUs are recommended for protection in accordance with the original habitat recommendations of the Oregon Endangered Species Task Force.

A revision of Task Force recommendations has resulted from recent data. The revision recommends that forests be managed to provide 1,000 acres of old growth per pair of owls within a 1.5 mile radius of nest sites. The number of spotted owl locations that would be protected under these recommendations in the short and long term are shown in Table 3-9.

Conclusions

Overall impacts on wildlife habitat would depend upon the alternative selected. Alternatives 1, 2 and 7 would reduce habitat diversity in the SYUs by generally restricting the amount of old growth, mature conifers and riparian habitat while increasing pole/sapling and young second growth stands. Pole/sapling and young second growth habitats have relatively simple structure even under natural conditions, and practices such as slash burning, thinning and brush control would further reduce their diversity. All alternatives except 1, 2 and 7 would retain habitat diversity in the SYUs by maintaining well-distributed stands of old-growth and mature conifers and well-protected riparian habitat.

Deer and upland game numbers are expected to be stable under all alternatives. In the short term, elk numbers would slightly decline under all alternatives except Alternative 7 which would result in a moderate decline. In the long term, numbers of elk would increase under the original proposed action and Alternatives 3, 4, 5, 6 and 8. Under all alternatives, old-growth-related species and woodpeckers would decline. The greatest number of spotted owl locations would be protected under the original proposed action and Alternatives 3, 4, 5, 6 and 8. Adoption of Alternative 1 would probably eliminate the spotted owl from BLM-administered land in the SYUs.

Changes in fish habitat and populations in the SYUs would be most adverse under Alternatives 1 and 7 and would be beneficial under the original proposed action and Alternatives 4, 5, 6 and 8. Beneficial changes would result primarily from more protective management practices. Adverse changes would result from logging on fragile sites and in riparian zones.

In all of western Oregon, the combined BLM timber management decisions for Medford and Coos Bay Districts and the new preferred alternatives for the Eugene, Roseburg and Salem Districts would come close to meeting the original Oregon Endangered Species Task Force recommendation for protection of the northern spotted owl. At the end of the first decade, it is expected that all western Oregon BLM districts combined would maintain habitat for at least 90 pairs of owls, resulting from allocations made in land use plans and harvest scheduling. Cumulative adverse impacts are expected to be minimal in the short term. Habitat for an estimated 78 of the recommended 90 pairs would be provided long-term protection through the land use planning process. In the long term, a BLM shortfall in providing the recommended portion of owl pairs may result in a significant adverse impact to the species unless the unmet needs are reapportioned by the Oregon Endangered Species Task Force.

IMPACTS ON RECREATION

The primary impacts of timber management on recreation are related to changes in physical setting and resource availability. Both types of change can affect levels and patterns of visitor use and opportunities for desired recreation experiences (see Glossary). For example, recreation use of some areas might be facilitated by new road construction. On the other hand, visitation may temporarily or permanently decline if an area's setting or resource availability is altered to the point where desired recreation experiences can no longer be realized. Anticipated changes in major recreation activities and opportunities are displayed by alternative in Table 3-10.

Table 3-10 Probable Changes in Recreation Activities
and Opportunities During Next Five Decades[1/]

Activities	Existing Conditions	Relative Changes by Alternative OPA,5,6,8	1	2	3	4	7
Facility Oriented							
Camping/Picnicking (existing and potential)	Good	–	––	0	–	0	0
Hiking/Horse Riding (existing and potential)	Fair	+	––	0	+	++	0
Sightseeing (potential)	Good	0	––	0	0	0	0
Non-Facility Oriented							
Hunting (big game)	Fair	+	–	–	+	++	–
Fishing	Fair	+	––	–	0	+	–
ORV Driving	Good	0	0	0	0	0	0
Other[2/]	Good	0	0	0	0	0	0

+ = Beneficial   – = Adverse   0 = None or Negligible

[1/] See Appendix J for primary criteria used to determine change ratings.

[2/] Includes dispersed activities such as collecting, rockhounding, camping, picnicking, upland game hunting and general sightseeing. Degree of change may vary between these activities under any one alternative. This table rates the collective changes for these activities.

Under Alternatives 2, 4 and 7, timber management would be excluded from all developed recreation sites and all sites identified as having development potential. Buffers are or would be provided at each site. Adverse impacts would be negligible, and future needs for facility-oriented activities would be accommodated. Alternative 1 would allow timber management activities on all sites with development potential and within buffers at all but one existing site (Sandy Oxbow County Park). These activities would create adverse visual and audible impacts and degrade the recreation experiece for some facility users. In addition, Alternative 1 would not protect potential for new facility development and would not accommodate future needs. The original proposed action and Alternatives 3, 5 and 6 would provide for timber harvest within some sites with development potential, restricted harvest in some buffers and minimal development of new facilities. With this level of timber management, some future recreation needs would not be accommodated by BLM under these alternatives. Alternative 8 would have the same impacts as the original proposed action except that all but one potential recreation site (Green Peter Peninsula) would be subject to timber harvest. Future needs for other than high-value sites would not be accommodated by BLM.

Under Alternative 4, timber management would be excluded from all existing trails, four potential trails and all trail buffers. Visual and audible impacts would be minimal, future demands for trail hiking and horse riding would be substantially met, and quality recreation experiences desired by many trail users could be attained.

The original proposed action and Alternatives 3, 5, 6 and 8 would provide for construction of two new trails (Columbia River Gorge and Elkhorn Creek). Existing and new trails would have buffers of varying widths and would be subject to restricted entry, e.g., road crossings. Some future needs would not be accommodated by BLM under these alternatives. There are no provisions in the original proposed action or Alternative 8 for protecting the potential Green Peter Peninsula and Quartzville Creek-Crabtree Mountain Trails. Alternative 1 has no provision for new trails or for buffers on existing trails. Existing trails would be subject to relocation as required to accommodate timber management activities. These activities would create high adverse visual and audible impacts and would degrade the recreation experience for most trail users. Alternative 1 would not accommodate future trail needs. Alternatives 2 and 7 are similar to Alternative 1 except that buffers of varying widths would be provided on existing trails. Most trails would be subject to impacts by restricted timber harvesting and road construction.

Under Alternative 4, all special sightseeing locations and their buffers would be excluded from timber management. Under all other alternatives except 1, some timber management would occur in buffers, creating negligible adverse impacts on primary sightseeing resources. Alternative 1 has no provision for protection or development of any special sightseeing values.

Impacts of timber management on non-facility oriented (i.e., dispersed) recreation activities would be beneficial or adverse, depending on the alternative and/or activity involved. Road construction and timber harvest would open new areas for ORV use under all alternatives, though increases would be negligible relative to existing opportunities. Under all alternatives, dispersed camping and picnicking locations may be directly impacted (e.g., by harvest of areas used). However, substitute areas would be available on other BLM-administered forest lands.

Impacts to fishing and big game hunting are primarily dependent upon impacts to animal populations (see Chapter 3, Impacts on Animals). Under Alternative 1, opportunities for fishing would be severely impacted, because fish populations would decline. Under all alternatives, fish populations would gradually increase. With the exception of Alternative 4, increases would not be enough to meet future demands for sport fishing. Localized alterations to stream settings would occur under all alternatives, but would be greatest under Alternatives 1, 2 and 7. These alterations would degrade desired recreation experiences for some anglers.

Future demand for upland game and deer hunting is expected to be met under all alternatives, but elk hunting opportunities would vary. Decreases in elk populations on BLM-administered land under Alternatives 1, 2 and 7 would create adverse impacts to big game hunting. Increases in elk populations under the original proposed action and Alternatives 3, 4, 5, 6 and 8 would benefit this activity.

The Table Rock and Green Peter Peninsula/Quartzville Creek areas would be designated and managed as Recreation Lands under Alternative 4 with timber management excluded. The original proposed action and Alternatives 5 and 6 provide for Recreation Lands on Green Peter Peninsula (Quartzville Creek area excluded). Under these alternatives, recreation resources in the Table Rock and Quartzville Creek areas would be partially protected by ACEC and other less formal designations (e.g., fragile sites, riparian zones and VRM classes). Timber harvest near Table Rock Trail would be limited to 10 percent removal per decade, and haul roads would be closed when not in use. Moderate adverse impacts from timber harvest and road construction .near the trail would occur. Alternatives 1, 2, 3 and 7 would not protect the potential for designation of any Recreation Lands. With the exception of Alternative 1, partial protection would be realized through less formal designations. Much of the Table Rock area would be subject to full timber management under Alternatives 1, 2 and 7, which would substantially degrade desired recreation experiences for most trail users. Timber management under Alternative 3 would be restricted to 5 percent removal per decade within portions of both the Table Rock area and Green Peter Peninsula. Alternative 8 would have the same impacts as the original proposed action except that Green Peter Peninsula would not be designated as Recreation Lands. The peninsula would, however, be protected pending development of a detailed multiresource management plan which would provide for recreation development.

Impacts on the potential Sandy River Gorge, Soosap Meadows and Table Rock (within proposed Table Rock Recreation Lands) Outstanding Natural Areas are discussed in Chapter 3, Areas of Critical Environmental Concern.

Alternative 4 fully protects BLM-administered land within a quarter-mile of segments of five rivers (Sandy, Salmon, Clackamas, North Santiam and South Santiam) which are potential national scenic or recreational rivers and/or State Scenic Waterways. Under Alternative 1, significant values associated with the five river segments would be subject to high adverse impacts from road construction and/or timber harvest within riparian zones. The Sandy River State Scenic Waterway would not be subject to timber management under any alternative except 1. Under all alternatives except 1 and 4, timber harvesting and road construction outside of riparian zones, but within a quarter-mile of the other rivers, could create low to high adverse visual and audible impacts. These impacts may be out of character with the rivers' settings. Potential timber management impacts within a quarter-mile of these rivers would be analyzed in environmental assessments which precede each action. If site-specific analysis determines that a proposed sale would adversely affect a river's outstanding values, BLM would consult with the State of Oregon and the National Park Service to develop appropriate mitigation measures.

Table 3-11 shows estimated recreation visitation in 1990 under the alternatives.

Table 3-11 Estimated Recreation Visitation (1990)

Visitor Days/Year

			Alternatives					
Activity	1975 Visitation	1990 Visitation Projection1/	OPA, 5,6,8	1	2	3	4	7
Hunting2/	10,400	11,700	11,900	11,500	11,600	11,800	12,200	11,500
Fishing3/	22,400	24,800	23,500	16,600	23,000	23,400	25,700	22,900
Other Recreation4/	276,000	341,000	348,000	286,000	314,000	334,000	357,000	306,000
Total	308,800	377,500	383,400	314,100	348,600	369,200	394,900	340,400

1/ Based on assumption of no change in physical environment.

2/ Differences in hunting estimates are primarily a result of expected impacts on animal populations.

3/ Except for Alternative 4, increases in fish populations would not be enough to meet future demands for sport fishing.

4/ Includes all other activities shown in Table 2-9 except hunting and fishing. Estimates for general recreation use are based on changes in physical setting and recreation resource/ facility availability and on the magnitude of recreation experience, degradation or enhancement.

Source: USDI, BLM 1980b; Salem District personnel.

Impacts of the sample 5-year timber sale plan on specific recreation resources are displayed in Table 3-12. Most sites and areas would be protected by buffers. However, slightly adverse ratings are given for short-term audible impacts and minor visual impacts created by timber harvest adjacent to buffers or by limited road construction and yarding through buffers. All designated and potential State Scenic Waterways and the three river segments identified under the Nationwide Rivers Inventory as potential national scenic or recreational river candidates would not be impacted under the sample 5-year sale plan.

Conclusions

Alternative 4 would provide the most benefits for recreation. Except for area-wide fishing, recreation needs would be fully met. The greatest adverse impacts on recreation would occur under Alternative 1, with severe degradation of most recreation experiences and only nominal provisions to accommodate future needs. Under all alternatives except 1 and 4, adverse impacts to recreation sites and resources would occur to varying degrees. Some facility needs would not be accommodated, and demand for some recreation opportunities would not be met. Adverse impacts would be greater under Alternatives 2 and 7 than under the original proposed action and Alternatives 3, 5, 6 and 8.

Table 3-12 Potential Impacts of the Sample 5-Year Timber Sale Plan on Recreation

Activities and Resources	Quality Rating[1]	Number of Harvest Units with Potential Impacts	Overall Impacts on Localized Visitor Use
Fishing[2]			Slightly adverse
Little Sandy River	A	1	
Gordon Creek	B	2	
Eagle Creek	A	1	
Little Eagle Creek	B	3	
South Fork Clackamas R.	B	2	
Clear Creek	B	4	
Lukens Creek	B	3	
Butte Creek	A	4	
Molalla River	A	2	
Table Rock Fork, Molalla R.	B	1	
Dead Horse Canyon Creek	B	8	
Abiqua Creek	A	1	
Thomas Creek	B	6	
Hamilton Creek	B	1	
Scott Creek	B	1	
Crabtree Creek	B	1	
West Fork Whitcomb Creek	B	1	
East Fork Whitcomb Creek	B	1	
Moose Creek	B	1	
Yellowstone Creek	B	4	
Sightseeing			Slightly adverse
Lukens Creek Loop Drive	A	3	
Yellowstone Access Road	A	2	
Quartzville Creek Drainage Old-growth Area	B	3	
Crabtree Creek Drainage Old-growth Area	B	5	
Gates Elk Herd	A	2	
Church Creek Beaver Colony	B	1	
Thomas Creek Elk Herd	A	1	
Galena Ridge Basalt Cliff	B	1	
South Fork Clackamas River Canyon	B	1	
General Leisure			Slightly adverse
Table Rock Trail		2	

[1] Quality ratings are as follows: A = high, B = moderate and C = low. They are determined in accordance with BLM Manual 6111.

[2] Impacts on localized fishing opportunities focus on stream segments to be managed for improving quality or increasing use. The quality rating is based on the sport fish species which provides the best fishing opportunities. Chapter 3, Impacts to Animals, Fish, provides further insight into sport fishing within the SYUs.

IMPACTS ON CULTURAL RESOURCES

Complete field surveys of the SYUs to identify cultural sites have not been undertaken. However, cultural resource surveys will precede each specific timber management action that would result in ground disturbance (BLM Manual 8100, Cultural Resource Management). Some sites may remain undiscovered even after surveys have been completed.

Table 3-13 shows changes from present conditions of cultural resource sites that might result from timber management under the alternatives.

Table 3-13 Probable Long-Term Changes in Cultural Resource Conditions

	Existing	Relative Changes by Alternative					
Sites	Conditions	OPA,5,6,8	1	2	3	4	7
National Register Listed or Eligible							
1. Table Rock Trail	Good	- 1/	-- 1/	- 1/	- 1/	0	-- 1/
2. Barlow Road	Good	0	- 2/	0	0	0	- 2/
3. Rock Corral	Good	0	- 2/	0	0	0	- 2/
Other Known Sites	Fair	0	- 3/	0	0	0	- 3/

+ = Beneficial   - = Adverse   0 = None or Negligible

1/ Possible impacts to site and visual setting

2/ Possible impacts to visual setting

3/ Sites subject to ground disturbance or disruption after appropriate data recovery

Under all alternatives, protection would be provided in accordance with the National Historic Preservation Act of 1966 and Executive Order 11593, as stated in the Code of Federal Regulations (36 CFR Part 800).

Under Alternative 4, all known cultural sites would be fully protected from ground disturbance. Under all alternatives except 4, Table Rock Trail, which has been determined eligible for the National Register, probably would be impacted at one point by a road crossing. Under the original proposed action and Alternatives 2, 3, 5, 6 and 8, the remaining known cultural sites on public land would be fully protected from ground disturbance.

Under Alternatives 1 and 7, sites (except Table Rock Trail) listed on or determined eligible for the National Register would be protected from ground disturbance, though impacts to their visual settings would occur. Appropriate measures for data recovery would be carried out for all other cultural sites prior to disturbance.

Cultural resources not discovered by field survey could be inadvertently impacted under all alternatives. The potential for damage would depend on the amount of timber harvested per decade under each alternative. Damage could occur through soil compaction, soil movement, fire or mixing of organic matter. Soil compaction and soil movement could damage artifacts and disrupt relative positions of cultural materials. Uncovering sites could also increase the possibility of illegal artifact collecting. Fire during slash disposal and site preparation could chemically alter cultural deposits, destroy combustible items and damage stone and ceramic artifacts. The mixing of organic matter could contaminate Carbon 14 dating samples, making them unreliable for scientific analysis.

It is not possible to estimate the number of undiscovered sites that could be impacted. Impacts to a site could completely obliterate structural remains and subtle indications of prehistoric activity. The top 20 inches of prehistoric sites with subsurface deposits could be severely impacted.

Road construction under all alternatives would provide additional access to known cultural sites, resulting in increased visitation. Vandalism, theft and site erosion could result. Esthetic, recreational, interpretive and educational qualities of the sites could be degraded. Road construction and/or timber removal on slopes above sites could result in increased rates of erosion and soil slumpage onto sites. These adverse impacts would be most likely to occur under Alternatives 1 and 7 and least likely under Alternative 4.

The landscape and vegetation surrounding a cultural site which compose its visual setting may be impacted by timber harvesting and road construction. Such impacts could reduce the site's esthetic appeal for recreation, interpretation and education. Impacts to the visual settings of cultural sites would be most likely under Alternative 1 and least likely under Alternative 4. Analysis indicates that no significant visual setting impacts would occur as a result of timber sales proposed in the sample 5-year timber sale plan. Site-specific analyses of additional sales will be included in the environmental assessments which precede each timber management action.

Conclusions

Appropriate measures would be taken to identify and protect cultural sites prior to ground-disturbing activities under all alternatives. Undiscovered cultural sites would be susceptible to damage from artifact breakage or destruction, displacement of materials and contamination of organic matter. Once a site is found, however, mitigation measures would be taken to minimize or avoid future damage. Under all alternatives except 1 and 7, sites newly discovered before logging would be managed to protect scientific and/or interpretive values.

Under Alternatives 1 and 7, sites listed on the National Register (except Table Rock Trail) would be protected from ground disturbance, although their visual settings may be altered. Table Rock Trail, determined eligible for the National Register, probably would be directly impacted by a road crossing. Appropriate measures for data recovery would be developed for all other sites. Data recovery may result in an irretrievable loss of some information as a result of not protecting sites until new methods for recovery and analysis are formulated.

Clearcutting, road construction and most other timber management practices change vegetative patterns, alter species composition, disrupt the land surface and thereby cause visual impacts. The severity of a visual impact depends on many factors including location, number, size and shape of clearcut units; location and design of proposed roads; yarding methods; amount and treatment of logging and road construction debris; and success of vegetative reestablishment in disturbed areas. The visual resource management (VRM) class is also important in determining impacts, because VRM classes are based upon an area's overall scenic quality, sensitivity level and distance zone (see Glossary).

In developing the alternatives, some VRM classes shown in Figure 2-3 were reclassified to resolve conflicts between timber management, visual resources and other resources. Reclassifications were either downgrades (e.g., Class II to III or IV) or upgrades (Class II to I). Downgrading of VRM classes increases the potential for adverse visual impacts. For example, Class IV VRM standards applied to lands downgraded from Class II might not adequately protect scenic values because VRM IV standards are less restrictive on management activities. Consequently, the long-term effect of downgrading might be to lower scenic quality in downgraded and adjacent areas. Nevertheless, the Bureau's ability to affect an area's overall scenic quality is often limited by intermingled land ownership patterns (see Figure 1-1). In some situations, visual impacts resulting from timber management activities on public lands might be consistent with visual impacts resulting from activities on surrounding lands. Therefore, downgrading and the consequent effects on overall scenic quality of BLM timber management activities might be negligible.

Table 3-14 shows, for each VRM class, probable long-term changes in visual resource conditions (scenic quality) under each alternative. Under Alternatives 1 and 7, existing visual resource conditions would deteriorate. Except for some Class I and II areas under Alternative 7, clearcuts and road construction would occur in highly scenic and sensitive areas, and the visual impacts of timber management activities in other areas would not be mitigated. Adverse visual impacts would also occur under Alternatives 2 and 3. Under Alternative 2, impacts would be highest in areas downgraded from Class II, and visual values in VRM IV areas would receive no consideration. Under Alternative 3, adverse impacts would primarily occur in Class III areas.

Under Alternative 4, visual resource conditions would improve. Adverse visual impacts in highly scenic and sensitive areas would not occur or would be mitigated. Under Alternative 4, all waterfalls would be protected, old-growth timber in VRM I, II and III areas would be increased, downgrading would not occur, and VRM class standards would be very high.

Table 3-14 Probable Long-Term Changes in Visual Resource Conditions

Existing Situation		VRM Class Acreage[3] and Changes in Condition[4]						
VRM Class[1]	Acres & Condition[2]	OPA,5,6	1	2	3	4[5]	7	8
I	7,200	8,200	0	8,000	7,500	7,200	3,000	7,000
	Good	0	--	0	0	0	--	--
II	23,100	9,100	0	3,600	15,100	23,100	1,500	9,900
	Good	-	--	--	0	+	--	-
III	39,700	20,500	0	16,300	18,900	39,700	0	20,900
	Fair	-	--	-	-	+	--	-
IV	89,900	122,100	0	0	118,400	89,900	0	122,100
	Fair	+	-	-	+	+	-	+

+ = Beneficial   - = Adverse   0 = None or Negligible

[1] Classifications per BLM Manual 8400 (see Chapter 2, Visual Resources, and Figure 2-3).

[2] Conditions (Good, Fair, Poor) determined by an inventory and evaluation of the scenic quality in the SYUs.

[3] VRM class (Existing Situation) acres with acreage adjustments made in each class for reclassified (downgraded or upgraded) areas.

[4] Ratings of change (+, -, 0) are not solely based upon changes in acreage from the existing situation. Ratings represent the anticipated effect of timber management on existing visual resource conditions, taking into consideration (1) VRM objectives for the areas remaining in the class (acres shown); (2) possible effects of downgrading and upgrading (acres not shown); and (3) characteristics and uses of adjacent lands (intermingled land ownership patterns).

[5] Under this alternative, VRM class acres (Existing Situation) would not be downgraded or upgraded.

Under the original proposed action and Alternatives 5 and 6, many highly scenic and sensitive areas would be protected, and visual resource values would be considered when planning timber management activities. However, adverse visual impacts would occur and would be highest in Class II and III areas. Visual impacts could result from clearcutting around some waterfalls, applying herbicides (except under Alternative 6) and removing some old-growth timber in Class II and III areas. Additionally, the scenic quality in areas with downgraded VRM classes might be lowered. Alternative 8 would have the same impacts as the original proposed action except that impacts in Class I areas under Alternative 8 would be greater.

Table 3-15 shows probable changes in visual resource conditions under the sample 5-year timber sale plan.

Table 3-15 Probable Changes in Visual Resource Conditions Under the Sample 5-Year Timber Sale Plan

VRM Class[1/] Existing Situation	Name of Area	County	Clearcut Units Within Area	Probable Change[2/]
I	Dead Horse Falls	Clack.	1	-
	Soosap	"	1	0
	Table Rock	"	2	0
	Triple Falls	Marion	1	-
	Cisco Falls	Linn	1	-
	Yellowstone Falls	"	4	--
II	Mt. Hood Highway 26	Clack.	3	0
	Molalla River Road	"	1	0
	Sawtell Road	"	7	0
	Butte Creek Road	"	4	-
	Little North Santiam Road	Marion	2	0
	Quartzville Access Road	Linn	10	-
III	Bornstedt Road	Clack.	1	0
	Smith Road	"	4	0
	Springwater Road	"	8	0
	Redland and Ridge Roads	"	2	-
	Howards Mill Road	"	1	0
	Hult Road	"	1	-
	Cox Road	"	1	-
	Divide Ridge Road	"	2	0
	Middle Fork Molalla Road	"	3	0
	Table Rock Access Road	"	5	-
	Sawtell Road	"	1	0
	Evans Mt. Road	Marion	3	0
	Fox Valley Road	"	2	-
	Thomas Creek Road	Linn	2	0
	Neal Creek Road	"	5	-
	Green Mt. Road	"	5	-
	Yellowstone Access Road	"	22	-
IV	All other unit locations		149	0

+ = Beneficial   - = Adverse   0 = None or Negligible

[1/] Classifications per BLM Manual 8400 (see Chapter 2, Visual Resources, and Figure 2-3).

[2/] Change ratings represent anticipated effects upon the overall scenic quality of the area (non-site-specific) caused by the clearcut units (location, number, size, shape, etc.) Site-specific visual impact assessments will be made along with recommendations for mitigation (if needed) when individual timber sales are proposed.

In VRM I areas listed in Table 3-15, the combined visual impact is expected to be moderate. Clearcuts will be seen from some waterfalls where natural conditions now exist. In Class II areas, the combined visual impact is expected to be low. Portions of some clearcut units in VRM II areas will be seen from a few viewpoints along some of the roads. None of the 27 clearcuts are adjacent to roads listed in the table. In Class III areas, the combined visual impact is expected to be moderate. Clearcutting will be seen from some county roads in rural residential locations and from major logging access roads used by recreational and other traffic. Two of the 68 units in Class III areas will be adjacent to county roads. In VRM IV areas, the combined visual impact is expected to be negligible. The average size of the 149 clearcut units in VRM IV areas will be approximately 24 acres. These clearcuts will occur in low sensitivity areas seldom seen by most people. Additionally, many of the areas are intermingled with previously harvested lands and with lands where forest management activities are ongoing.

Conclusions

Alternative 4 would provide the highest level of protection for visual resources. Scenic and sensitive areas would be protected and the scenic qualities of public lands in all VRM classes would be maintained or improved. Under Alternative 3, overall adverse visual impacts would be low. Most scenic and sensitive areas would be protected. Under the original proposed action and Alternatives 5, 6 and 8, overall visual impacts would be moderate. Many highly scenic and sensitive areas would be protected, and the scenic qualities of some downgraded VRM I, II and III areas might be lowered. Under Alternatives 1, 2 and 7, overall visual impacts would be high. Visual resource values in all classes would receive no timber management considerations under Alternative 1. Even though some highly scenic and sensitive areas would be protected under Alternatives 2 and 7, results of substantial class downgrading would allow timber management activities that might lower scenic qualities in many areas.

IMPACTS ON AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Timber management impacts on potential Areas of Critical Environmental Concern (ACECs) or on areas with other current or prospective special designations would vary depending upon management prescriptions proposed under each alternative. (Original land use alternatives did not include ACECs.) Table 3-16 depicts anticipated changes in existing conditions by alternative.

Alternative 4 permits no timber harvest, road construction or treatments within the areas as originally nominated (see Table 2-10). Under this alternative, resources would be protected, and vegetation buffers would be retained. Alternative 1 has no provision for any protective designations, and most ACEC values would be lost.

Under all alternatives except Alternative 1, BLM-administered land in Columbia River Gorge, Sandy River Gorge and Middle Santiam Terrace would remain unharvested. Under all alternatives except 1 and 7, Carolyn's Crown would remain unharvested. Under the original proposed action and Alternatives 5, 6 and 8, the three remaining areas would be managed by protecting primary zones (areas containing critical resource values) and allowing timber harvest at the rate of 10 percent removal per decade (minimum harvest age of 100 years) in surrounding buffer zones. Timber removal in buffer zones could cause changes in primary zone vegetation. Alternative 3 would allow harvest at 5 percent removal per decade in the buffer zone of the potential Table Rock ACEC. Under Alternatives 2 and 7, Williams Lake, Soosap Meadows and Table Rock primary zones could be adversely affected by adjacent timber management activities. In some cases, activities could occur within primary zones (i.e. no protective designations would apply or designations would be made which allow entry when unavoidable). Major vegetation changes in or adjacent to potential ACECs may lead to damage or loss of cultural and/or natural values (see Appendix K for specific impacts).

Analysis of the sample 5-year timber sale plan indicates that three sales would involve lands within potential ACECs. The potential Table Rock ACEC has two units within its buffer zone. One unit lies within the buffer zone of the potential Soosap Meadows ACEC. Appropriate measures would be taken to prevent direct damage to critical resources in these potential ACECs.

Table 3-16 Probable Changes in Potential ACECs
During Next Five Decades1/

Potential ACECs	Existing Condition	Relative Changes by Alternative OPA,5,6,8	1	2	3	4	7
Columbia River Gorge	Good	0	--	0	0	0	0
Sandy River Gorge	Good	0	--	0	0	0	0
Williams Lake	Fair	0	--	-	0	0	--
Soosap Meadows	Good	0	--	-	0	0	-
Table Rock	Good	0	--	-	0	0	-
Carolyn's Crown	Good	0	--	0	0	0	-
Middle Santiam Terrace	Fair	0	--	0	0	0	0

+ = Beneficial - = Adverse 0 = None or Negligible

1/ Criteria used to determine change ratings are presented in Appendix K.

IMPACTS OF HERBICIDES ON HUMAN HEALTH

The possibility of human health being impacted by the use of herbicides is related to the toxicity of the herbicide, the likelihood of exposure and resulting dosage received (Norris 1975). While no chemicals are non-toxic, a substance of moderate or high toxicity may represent no significant hazard if exposure is very low, just as a relatively non-toxic agent may be harmful if exposure is extensive and long term. Herbicides proposed for use in the SYUs are shown in Table 1-4, and their toxicities and activities are shown in Table 3-17.

In general, exposure of humans to herbicides can occur in two ways: directly, by occupational means or indirectly by environmental means. The number of persons that could be affected by herbicide application in the SYUs is very small. Planned application techniques have been shown to effectively reduce or prevent spray from drifting onto streams and water bodies. Posting of sprayed areas should effectively minimize involuntary exposure of forest workers to herbicides.

All herbicides proposed for use in the SYUs are registered with the Environmental Protection Agency (EPA). Extensive studies of the absorption, distribution, metabolism and excretion of herbicides in animals have shown that herbicides and their metabolites are rapidly eliminated from tissues of most animals (including humans) and thus do not accumulate to harmful levels (Eligehausen et al. 1980, Lavy et al. 1982, Leng et al. 1982, Nash et al. 1982, Newton and Norris 1968, Norris et al. 1974, Sikka et al. 1977, and Wolfe 1976). No evidence of carcinogenic effects exists for any of the herbicides listed in Table 3-17. However, with respect to 2,4-D, picloram, glyphosate, atrazine and fosamine, some additional direct data is needed to assure certitude. The laboratory dosages at which potential reproductive effects have been detected or at which carcinogenic and mutagenic effects have been sought are much greater in concentration and duration than any exposure that could occur in the forest as a result of vegetation control treatments. Because of the limited toxicity of the herbicides and the low potential for exposure, the likelihood of an adverse impact on human health is negligible.

IMPACTS ON ENERGY USE

Table 3-18 indicates the energy investment required, by alternative, as expressed in British thermal units (Btu's - see Glossary). All energy consumed would be in the form of fossil fuels or derivatives, and any energy investment would constitute an irretrievable reduction of world supplies of petroleum-derived energy. Table 3-18 further illustrates that the majority of energy consumed is attributable to log production (all actions taken to harvest trees and get logs to the mill) and road development and maintenance.

The annual energy consumption ranges from .331 trillion Btu's (Alternative 4) to .599 trillion Btu's (Alternative 1). If the .461 trillion Btu's attributable to the new preferred alternative were all expended in the form of gasoline, it would equate to 3.7 million gallons, or about 0.3 percent of the 1.29 billion gallons of gasoline consumed in Oregon in 1980. This energy investment is about 0.1 percent of the projected 1980 Oregon total of 581 trillion Btu's (Oregon Department of Energy 1980).

Table 3-17 Herbicide Toxicity

	Acute Toxicity				
Common Name	LD$_{50}$1/ (Rats)(mg/kg)	Commonly Used Term2/	Activity in the Soil	No-effect Level Dose (mg/kg/day)	Tolerances for Residues in or on Foodstuffs (parts per billion)3/
Asulam (Asulox)	8,000	Practically non-toxic	Short persistence—half-life 6 to 14 days.	(not available)	100
Atrazine	3,080	Slightly toxic	Adsorbed on muck or clay--remains in 1 foot of soil.	200 (reproductive3/)	20-250
2,4-D	300-1,000	Moderately toxic to slightly toxic	Leached in sandy soils, breakdown depends on microbial activity.	20 (reproductive) 20 (teratogenic4/)	100-500
Dalapon (Dowpon)	7,570 (female) 9,330 (male)	Practically non-toxic	Leaches readily in soil, breakdown rapid and complete.	50-150 (reproductive) 500 (teratogenic)	100-10,000
Fosamine (Krenite)	24,400	Relatively harmless	Rapid degradation--very little movement.	60 (reproductive) 600 (teratogenic)	(non-listed)
Glyphosate (Roundup)	4,320-4,900	Slightly toxic	Strong absorption--very little or no leaching.	30 (reproductive) 30 (teratogenic)	100-6,000
Hexazinone (Velpar)	1,690	Slightly toxic	Half-life 2 to 6 months in silt loams.	60 (reproductive) 300 (teratogenic)	100-200
Picloram (Tordon)	8,200	Practically non-toxic	Absorption by organic matter and clays, may leach in sandy soils.	80-150 (reproductive) 1,000 (teratogenic)	50-500
Triclopyr (Garlon)	2,140-2,830	Slightly toxic	Possible leaching, half-life of 46 days.	30 (reproductive) 200 (teratogenic)	(non-listed)

1/ LD$_{50}$ (Lethal Dose 50) is the dose of a substance that is fatal to 50 percent of the test animals. Also known as median lethal dose.

2/ Moderately toxic is 50-500 mg/kg; slightly toxic is 500-5,000 mg/kg; practically non-toxic is 5,000-15,000 mg/kg; relatively harmless is more than 15,000 mg/kg in a single oral dose to rats.

3/ The highest dosage level at which no effects have been observed in test animals including loss of skin hair, reduced litter size, or general lethal toxicity.

4/ Fetus malformations during development, not associated with genetic change.

Table 3-18 Estimated Annual Energy Consumption Attributable to the Alternatives

New Preferred Alternative

Treatment	Units	Estimated Cost per Unit[1] ($)	Assumed Energy Requirement per $ of Cost (1,000 Btu's)	Energy Consumption (1,000,000 Btu's)
Roads				
New Construction	9.1 miles	50,000	80	36,400
Reconstruction	5.0 miles	15,000	60	4,500
Log Production (all actions taken to cut trees and get logs to the mill)	93.3 MM bd. ft.	75	55	384,862
Site Preparation				
Broadcast Burning	1,005 acres	250	31	7,789
Herbicide [2]	240 acres	90	122	2,635
Mechanical	450 acres	235	30	3,173
Plantation Maintenance and Release [2]	470 acres	90	122	5,161
Planting	2,000 acres	105	31	6,510
Precommercial Thinning	935 acres	80	31	2,319
Fertilization [3]	730 acres	70	122	6,234
Plantation Protection	460 acres	125	31	1,783
Total				461,366

Energy Requirements for the Alternatives

	OPA	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6[4]	Alt. 7	Alt. 8
Total Energy Consumption (Trillion Btu's)	.468	.599	.469	.462	.331	.495	.425	.450	.461

[1] BLM estimated costs per unit were often a range of values. The listed costs were selected as indicative of the SYUs for 1980. Similarly, DOE energy requirements were also given as a range in some cases.

[2] Diesel carrier (when used) has been considered in determining costs and energy requirements for herbicide application.

[3] Costs and energy requirements for fertilization account for the conversion of petroleum-based raw materials for manufacture and energy requirements for delivery and application.

[4] Manual methods for plantation release have been considered during the computation of energy use for Alternative 6.

Source: BLM data except for assumed energy requirements per dollar of cost, which were derived by Department of Energy, Region X Staff.

Socioeconomic impacts are displayed in terms of two different base conditions. First, impacts are measured from an "existing condition" baseline representing recent experience (excepting the current timber market depression) in terms of economic activity generated by lands in the SYUs. (See Figure 2-5 for graph of BLM harvest volumes over the past decade.) The purpose of this comparison is to place the potential effects of the alternative programs in the context of recent economic conditions so that affected publics can understand how future economic conditions would differ from current conditions. Secondly, impacts are measured from the "no action" baseline representing anticipated average conditions over the next decade if the current management program were continued. This comparison is designed to show the program manager how future conditions would be affected by program changes.

Short-Term Economic Impacts

Tables 3-19 and 3-20 show projections representing average local employment and earnings dependent on timber sales under the alternatives during the first decade after implementation. Impacts on employment and earnings would be phased in over a period of 2 or 3 years due to the customary time lag between sale and harvest. Impacts on receipts would be delayed an additional year.

While labor productivity is expected to increase in future years leading to fewer jobs per unit of production (Wall and Oswald 1979), the impact estimates have not been adjusted to reflect productivity changes in order to make them simpler and more readily understood. The effect of this simplification is to overstate the impacts on employment and earnings by about 10 percent in the short term and possibly by greater amounts in the long term.

As shown in Table 3-19, continuation of the current management program (Alternative 7) would increase local employment in timber harvesting and processing by 56 workers on the average during the next decade over the number employed under the existing condition. (Data for the existing condition are shown in the first column of the table.) Employment in forest management activities not normally performed in conjunction with logging would remain at the same level as in the existing condition. The equivalent of 11 full-time workers would be employed on a number of seasonal and intermittent activities such as tree planting and brush control. About 166 more workers in all would be employed, and $2,239,000 more would be earned annually than in the existing condition. Compared to the existing condition, all alternatives except 4 would have positive impacts. Alternative 4 would cause the loss of 238 timber industry jobs and 707 jobs in the economy as a whole, and would reduce income by $9,527,000 in the EIS area. Under Alternative 4, reductions in total covered employment for individual counties would amount to: Clackamas, -0.5 percent; Linn, -0.8 percent; Marion, -0.1 percent; and Multnomah, -0.03 percent.

Local communities dependent on BLM timber supplies (see Chapter 2, Socioeconomic Conditions) would probably experience similar impacts, but information is not available to quantify them. Alternative 1 would have the greatest positive economic impacts.

Table 3-19 Short-Term Impacts Compared to Existing Condition on Local Employment and Earnings Related to Timber Harvest
(Average annual amounts during first decade, earnings in thousands of 1979 dollars)

	Existing Condition 1/	Change From Existing Condition								
		OPA	Alt. 1 Max. Tbr.	Alt. 2 Emp. Tbr.	Alt. 3 Mod. Tbr.	Alt. 4 Emp. Other	Alt. 5 Acc. Tbr.	Alt. 6 No Herb.	Alt. 7 2/ No Action	Alt. 8 NPA
CLACKAMAS COUNTY										
Timber industry employment	249	+32	+126	+38	+35	-72	+58	+18	+17	+38
Logging & processing 3/	245	+32	+124	+38	+35	-71	+57	+17	+17	+38
Forest management 4/	4	0	+2	0	0	-1	+1	+1	0	0
Total employment 5/	981	+127	+498	+151	+139	-285	+227	+71	+67	+151
Total earnings	$12,991	+$1,681	+$6,592	+$1,999	+$1,840	-$3,775	+$3,005	+$939	+$886	+$1,999
LINN COUNTY										
Timber industry employment	378	+50	+192	+59	+55	-110	+87	+27	+26	+59
Logging & processing 3/	373	+49	+189	+58	+54	-109	+86	+26	+26	+58
Forest management 4/	5	+1	+3	+1	+1	-1	+1	+1	0	+1
Total employment 5/	821	+109	+417	+129	+119	-238	+189	+58	+56	+129
Total earnings	$11,467	+$1,519	+$5,819	+$1,800	+$1,659	-$3,326	+$2,644	+$815	+$785	+$1,800
MARION COUNTY										
Timber industry employment	78	+10	+40	+12	+11	-23	+18	+5	+5	+12
Logging & processing 3/	76	+10	+39	+12	+11	-22	+18	+5	+5	+12
Forest management 4/	2	0	+1	0	0	-1	0	0	0	0
Total employment 5/	282	+36	+143	+43	+40	-84	+63	+19	+19	+43
Total earnings	$3,353	+$430	+$1,702	+$511	+$470	-$995	+$755	+$227	+$227	+$511
MULTNOMAH COUNTY										
Timber industry employment	114	+15	+59	+18	+16	-33	+26	+8	+8	+18
Logging & processing 3/	114	+15	+59	+18	+16	-33	+26	+8	+8	+18
Forest management 4/	0	0	0	0	0	0	0	0	0	0
Total employment 5/	345	+45	+175	+54	+50	-100	+80	+24	+24	+54
Total earnings	$4,914	+$646	+$2,494	+$768	+$707	-$1,431	+$1,135	+$341	+$341	+$768
EIS AREA										
Timber industry employment	819	+107	+416	+127	+117	-238	+189	+58	+56	+127
Logging & processing 3/	808	+106	+410	+126	+116	-235	+187	+56	+56	+126
Forest management 4/	11	+1	+6	+1	+1	-3	+2	+2	0	+1
Total employment 5/	2,429	+317	+1,233	+377	+348	-707	+559	+172	+166	+377
Total earnings	$32,725	+$4,276	+$16,607	+$5,078	+$4,676	-$9,527	+$7,539	+$2,322	+$2,239	+$5,078

1/ Existing condition is based on 1976-78 average harvest of 80.4 million board feet per year. These estimates differ from those in Table 2-16 because of the inclusion of forest management employment.

2/ No action condition in this table shows the change from the existing situation which would occur if the existing program were continued.

3/ Logging and processing includes all timber industry employment as presented in Table 2-16. Estimated here by ratio of timber industry employment generated in county to total harvest from BLM-administered lands in the EIS area as derived from Table 2-16.

4/ Forest management employment represents the employment of workers normally classified in other industries but included in the timber manufacturing industry here for convenience because of their small values. See Appendix M for their calculation.

5/ For the various alternatives, total employment includes the changes in employment in all industries resulting from the change in timber industry employment (also included).

Table 3-20 Short-Term Impacts Compared to No Action Condition on Local Employment and Earnings Related to Timber Harvest
(Average annual amounts during first decade, earnings in thousands of 1979 dollars)

Item	Projected County Total (1985)1/	Change From No Action Condition								No Action Condition (Alt. 7)2/
		OPA	Alt. 1 Max. Tbr.	Alt. 2 Emp. Tbr.	Alt. 3 Mod. Tbr.	Alt. 4 Emp. Other	Alt. 5 Acc. Tbr.	Alt. 6 No Herb.	Alt. 8 NPA	
CLACKAMAS COUNTY										
Timber industry employment	4,725	+15	+109	+21	+18	-89	+41	+1	+21	266
Logging & processing3/	NA	+15	+107	+21	+18	-88	+40	0	+21	262
Forest management4/	NA	0	+2	0	0	-1	+1	+1	0	4
Total employment5/	79,600	+60	+422	+84	+72	-352	+160	+4	+84	1,048
Total earnings	$1,054,000	+$795	+$5,589	+$1,113	+$954	-$4,661	+$2,118	+$52	+$1,113	$13,877
LINN COUNTY										
Timber industry employment	6,675	+24	+164	+33	+29	-136	+61	+1	+33	404
Logging & processing3/	NA	+23	+161	+32	+28	-135	+60	0	+32	399
Forest management4/	NA	+1	+3	+1	+1	-1	+1	+1	+ 1	5
Total employment5/	43,150	+53	+353	+73	+63	-294	+133	+2	+73	877
Total earnings	$603,000	+$734	+$4,935	+$1,015	+$875	-$4,111	+$1,859	+$30	+$1,015	$12,252
MARION COUNTY										
Timber industry employment	3,100	+5	+34	+7	+6	-28	+12	0	+7	83
Logging & processing3/	NA	+5	+33	+7	+6	-27	+12	0	+7	81
Forest management4/	NA	0	+1	0	0	-1	0	0	0	2
Total employment5/	111,000	+17	+121	+24	+21	-103	+44	0	+24	301
Total earnings	$1,320,000	+$203	+$1,442	+$284	+$244	-$1,221	+$528	0	+$284	$3,580
MULTNOMAH COUNTY										
Timber industry employment	5,775	+7	+49	+10	+9	-41	+18	0	+10	122
Logging & processing3/	NA	+7	+49	+10	+9	-41	+18	0	+10	122
Forest management4/	NA	0	0	0	0	0	0	0	0	0
Total employment5/	412,500	+21	+149	+30	+26	-124	+56	0	+30	369
Total earnings	$5,879,000	+$305	+$2,116	+$428	+$367	-$1,772	+$794	0	+$428	$5,254
EIS AREA										
Timber industry employment	20,275	+51	+354	+71	+62	-294	+132	+2	+71	875
Logging & processing3/	NA	+50	+348	+70	+61	-291	+130	0	+70	864
Forest management4/	NA	+1	+6	+1	+1	-3	+2	+2	+1	11
Total employment5/	646,250	+151	+1,045	+211	+182	-873	+393	+6	+211	2,595
Total earnings	$8,856,000	+$2,037	+$14,082	+$2,840	+$2,440	-$11,765	+$5,299	+$82	+2,840	$34,963

NA - Not available.

1/ Employment projections from U.S. Department of Energy, Bonneville Power Administration 1979.

2/ No action condition reflects the amount of employment and income expected to be generated under the existing program.

3/ Logging and processing includes all timber industry employment as presented in Table 2-16. Estimated here by ratio of timber industry employment generated in county to total harvest from BLM-administered lands in the EIS area as derived from Table 2-16.

4/ Forest management employment represents the employment of workers normally classified in other industries but included in the timber manufacturing industry here for convenience because of their small values. See Appendix M for their calculation.

5/ For the various alternatives, total employment includes the changes in employment in all industries resulting from the change in timber industry employment (also included).

As shown in Table 3-20, the total employment generated in the four-county area by a continuation of the current management program (no action condition) would average 2,595 jobs, and income generated as measured by worker earnings would amount to $34,963,000 in 1979 dollars.

As compared with a continuation of current management, the new preferred alternative would sustain about 71 more jobs in the timber industry and 151 more jobs in the local economy as a whole (including the lumber industry). Local income would be increased by $2,840,000 annually. As shown in Table 3-20, employment and earnings would be slightly more in each of the counties. Impacts on employment and earnings for the other alternatives are also shown in Table 3-20. Adverse impacts would result only from Alternative 4, which would reduce total employment by 873 jobs and total earnings by $11,765,000.

Table 3-21 shows impacts on income and employment related to fishing, hunting and other recreation. Compared to the no action condition, impacts related to these activities are positive except for some negative impacts under Alternatives 1 and 2.

The net short-term impacts on income (earnings) and employment related to timber production, fishing, hunting and other recreation are summarized for each alternative in Table 3-22.

Table 3-21 Short-Term Impacts Compared to No Action Condition on Local Income and Employment Related to Fishing, Hunting and Other Recreation (Income in thousands of 1979 dollars)

	Fishing 1/		Hunting		Other Recreation	
Alternative	Income	Employment	Income	Employment	Income	Employment
OPA	+ 4.6	0	+ 2.1	0	+149.6	+18
1. Max. Tbr.	-77.0	- 7	0.0	0	- 71.2	- 9
2. Emp. Tbr.	-31.0	- 2	+ 0.5	0	+ 28.5	+ 3
3. Mod. Tbr.	+ 1.7	0	+ 1.5	0	+ 99.7	+12
4. Emp. Other	+40.8	+ 3	+ 3.6	0	+181.7	+22
5. Acc. Tbr.	+ 4.6	0	+ 2.1	0	+149.6	+18
6. No Herb.	+ 4.6	0	+ 2.1	0	+149.6	+18
7. No Action	2/	2/	2/	2/	2/	2/
8. NPA	+ 4.6	0	+ 2.1	0	+149.6	+18
Expected Amounts under No Action	265.8	24	59.3	7	1,090.0	133

1/ Includes income and employment generated in other parts of Oregon and in Washington.

2/ There are no impacts under the no action condition, since in this table it serves as the base from which the impacts are measured.

Table 3-22 Summary of Impacts on Income and Employment

Alternative	For Existing Condition[1/] Earnings	For Existing Condition[1/] Employment	For No Action Condition Earnings	For No Action Condition Employment
OPA	+$ 4,297,000	+ 319	+$ 2,193,000	+ 169
1. Max. Tbr.	16,324,000	+1,201	+ 13,934,000	+1,029
2. Emp. Tbr.	+ 4,941,000	+ 362	+ 2,838,000	+ 212
3. Mod. Tbr.	+ 4,644,000	+ 344	+ 2,543,000	+ 194
4. Emp. Other	- 9,436,000	- 698	- 11,539,000	- 848
5. Acc. Tbr.	+ 7,560,000	+ 561	+ 5,455,000	+ 411
6. No Herb.	+ 2,343,000	+ 174	+ 238,000	+ 24
7. No Action	+ 2,194,000	+ 150	0	0
8. NPA	+ 5,099,000	+ 379	+ 2,996,000	+ 229

[1/] Includes the existing condition for recreation, which approximates the no action condition.

Current and projected distributions of O&C revenues are shown in Table 3-23. The actual distribution from Eastside Salem lands in fiscal 1980 is shown in the first column of the table. The projected distributions represent the various harvest levels valued at the average timber sale price in the SYUs in fiscal 1980 ($271,130/MM bd. ft.).

Table 3-24 shows the impact as compared to the no action condition of differences in O&C payments on local government finances. The differences are shown as percentages of total property tax levies to indicate overall fiscal impacts. The table shows that impacts would be positive except under Alternative 4. Under that alternative, Curry County, the most impacted county, would experience a revenue reduction equivalent to 4.1 percent of total levies. Local governments in Curry County would have to increase property taxes or other revenues by a like amount or reduce expenditures. The other O&C counties would be similarly affected to a lesser degree. Impacts as compared to the existing situation (1976-78 average harvest level) would be similar in direction and size to those for the no action condition.

Payment to the State from revenues from public domain lands would be increased by minor amounts under all alternatives when compared to the present condition. Compared to the no action condition they would be less by about $19,000 annually under Alternative 4, but would be increased under all other alternatives.

Long-Term Economic Impacts

Long-term impacts related to timber production under each alternative would generally be very similar to short-term impacts. Impacts on local employment and earnings would be reduced over time if worker productivity continued to increase. Lower timber industry employment due to reduced private timber supplies would make the impacts larger in relation to the timber industry.

Economic activity related to fishing would increase slightly under the new preferred alternative and by greater amounts under Alternative 4, but would be reduced under Alternatives 1 and 2.

Table 3-23 Distribution of O&C Payments from SYUs to Counties
(thousands of dollars)

County	Actual Payments FY 1980	Existing Condition (1976-78)2/	Projected Payments								
			Original Proposed Action	Alt. 1 Max. Tbr.	Alt. 2 Emp. Tbr.	Alt. 3 Mod. Tbr.	Alt. 4 Emp Other	Alt. 5 Acc. Tbr.	Al. 6 No Herb.	Alt. 7 No Action	Alt. 8 NPA
Benton	$ 169	$ 286	$ 324	$ 431	$ 331	$ 327	$ 203	$ 352	$ 306	$ 306	$ 332
Clackamas	333	565	639	852	653	646	400	695	604	604	655
Columbia	124	210	237	317	242	240	149	258	224	224	243
Coos	354	600	679	904	694	687	426	739	642	642	696
Curry	219	371	420	559	429	425	263	457	397	397	430
Douglas	1,505	2,548	2,884	3,841	2,948	2,916	1,807	3,138	2,726	2,726	2,954
Jackson	941	1,594	1,804	2,403	1,844	1,824	1,130	1,963	1,705	1,705	1,848
Josephine	726	1,229	1,391	1,853	1,421	1,406	871	1,513	1,314	1,314	1,425
Klamath	141	238	269	359	275	272	169	293	255	255	276
Lane	917	1,553	1,758	2,341	1,797	1,777	1,101	1,913	1,662	1,662	1,800
Lincoln	22	37	41	56	42	42	26	45	39	39	43
Linn	159	269	304	406	311	307	190	331	287	287	312
Marion	88	149	168	225	172	170	105	183	159	159	173
Multnomah	65	111	126	167	128	127	79	137	119	119	129
Polk	130	220	249	332	254	251	156	271	235	235	255
Tillamook	34	57	64	86	66	65	40	70	61	61	66
Washington	38	64	73	96	74	73	45	79	69	69	74
Yamhill	43	73	83	110	85	84	52	90	78	78	85
Total	$6,007	$10,173	$11,514	$15,335	$11,767	$11,640	$7,212	$12,526	$10,881	$10,881	$ 11,793

1/ Projected O&C payments were estimated as one-half the portion of total harvest derived from O&C lands, valued at the average sale price for Eastside Salem stumpage in FY 1980.

2/ Existing condition establishes a baseline for comparison represented by 1976-78 average harvest of 80.4 million board feet valued at the FY 1980 average sale price. The actual distribution from Eastside Salem harvest in FY 1980 is shown in the first column.

Table 3-24 Short-Term Impacts of O&C Payments on Local Government Finances
(Changes in O&C payments shown as percent of 1980-81 total property tax levies)

County	1980-81 Total Levies ($1000)	Change from No Action Condition [1] OPA	Alt. 1 Max. Tbr.	Alt. 2 Emp. Tbr.	Alt. 3 Mod. Tbr.	Alt. 4 Emp. Other	Alt. 5 Acc. Tbr.	Alt. 6 No Herb.	Alt. 8 NPA	Alt. 7 No Action Condition[2]
Benton	$ 26,018	+0.1	+0.4	+0.1	+0.1	-0.4	+0.2	0	+0.1	1.2
Clackamas	117,365	+0.0	+0.2	+0.0	+0.0	-0.2	+0.1	0	0.0	0.5
Columbia	17,218	+0.1	+0.4	+0.1	+0.1	-0.4	+0.2	0	+0.1	1.3
Coos	22,794	+0.2	+0.9	+0.2	+0.2	-0.9	+0.4	0	+0.2	2.8
Curry	3,261	+0.7	+4.0	+1.0	+0.8	-4.1	+1.8	0	+1.0	12.2
Douglas	30,742	+0.5	+3.1	+0.7	+0.6	-3.0	+1.3	0	+0.7	8.9
Jackson	46,413	+0.2	+1.2	+0.3	+0.3	-1.2	+0.6	0	+0.3	3.7
Josephine	18,723	+0.4	+2.3	+0.6	+0.5	-2.4	+1.1	0	+0.6	7.0
Klamath	19,457	+0.1	+0.4	+0.1	+0.1	-0.4	+0.2	0	+0.1	1.3
Lane	128,887	+0.1	+0.4	+0.1	+0.1	-0.4	+0.2	0	+0.1	1.3
Lincoln	21,438	+0.0	+0.1	+0.0	+0.0	-0.1	+0.0	0	+0.0	0.2
Linn	36,465	+0.0	+0.3	+0.1	+0.1	-0.3	+0.1	0	+0.1	0.8
Marion	81,858	+0.0	+0.1	+0.0	+0.0	-0.1	+0.0	0	+0.0	0.2
Multnomah	289,074	+0.0	+0.0	+0.0	+0.0	-0.0	+0.0	0	+0.0	0.0
Polk	17,345	+0.1	+0.5	+0.1	+0.1	-0.5	+0.2	0	+0.1	1.4
Tillamook	6,264	+0.1	+0.3	+0.1	+0.1	-0.3	+0.1	0	+0.1	1.0
Washington	124,592	+0.0	+0.0	+0.0	+0.0	-0.0	+0.0	0	+0.0	0.1
Yamhill	23,271	+0.0	+0.1	+0.0	+0.0	-0.1	+0.1	0	+0.0	0.3
Total	$1,031,185	+0.1	+0.4	+0.1	+0.1	-0.4	+0.2	0	+0.1	1.1

[1] Derived from Table 3-23. For example, the impact shown for Benton County under the original proposed action represents payments to Benton County under the original proposed action less those under the no action alternative as a percent of total levies (($324,000-306,000) ÷ $26,018,000/100= 0.1%).

[2] The no action condition represents the distribution of O&C revenues from the SYUs (Table 3-24).

Other Social Impacts

Employment impacts under Alternative 4 would cause the loss of jobs as soon as the current backlog of timber sold, but not cut, is used up. If timber job losses were associated with a mill closure, workers in the core work force would be unemployed. Older workers might not be able to obtain new jobs. The personal losses would be great for these individuals deprived of their functional relationship to society.

The use of herbicides would continue to be controversial due to concerns of some residents about ecosystem damage or health damage as opposed to the concerns of other residents for economic benefits in timber production.

Underlying conflict between people with personal economic concerns (such as the timber industry) and those with other personal concerns may be increased. The impacts of specific treatments (such as herbicide application) on personal and community concerns would depend in part on the locations of treatment application and the manner in which BLM communicates and negotiates its actions with affected residents.

Residents of timber-dependent localities may be affected by their perception of the degree of control they exercise over local affairs. Some local residents are likely to feel that their concerns have not been adequately addressed and that they have reduced control over local affairs. According to a survey cited in Chapter 2, more residents of metropolitan Portland and the Willamette Valley favor increased wildlife habitat, more wilderness, and more hiking, camping, hunting and fishing opportunities than favor increased timber production. The net impacts of the alternatives in terms of these concerns are indeterminable, since they would depend on the intensity of the concern, the knowledge of the holder, and the specific alternatives being compared.

CHAPTER 4

CONSULTATION AND COORDINATION ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

Consultation and coordination on the Eastside Salem Timber Management Draft EIS took place with many Federal and State agencies and local governments. Most extensive were coordination efforts with county planning departments, Oregon State Department of Forestry and Oregon Department of Fish and Wildlife.

The draft EIS (Interior DEIS 82-1) was filed with the Environmental Protection Agency and released to the public on January 22, 1982, and open to comment until March 23, 1982.

A public workshop to discuss the draft was held March 2, 1982, in Salem, Oregon.

A total of 413 letters and response forms were received in response to the draft EIS. These are listed in the Response to Written Comments section. Substantive comments were identified in 48 letters; thirty-two of these letters and responses to all substantive comments are printed on the following pages. Copies of all comment letters and response forms are available for review in the Salem District Office, 1717 Fabry Road S.E., Salem, Oregon.

All letters and forms were reviewed and considered. Comments that presented new data, questioned facts on the adequacy of the impact analysis, or raised questions or issues bearing directly on the draft EIS are responded to in this final EIS. These comments are responded to in Response to Written Comments.

Response to Written Comments

All comment letters received were assigned an index number. Material enclosed with Letters 95 and 96 is available for review at the Salem District Office.

Letter No.	Agency, Organization or Individual
1.	U.S. Department of Energy
2.	USDA, Forest Service
3.	North West Timber Association
4.	City of Salem, Dept. of Public Works
5.	Kathryn McCready
6.	City of Portland, Bureau of Water Works
7.	Mid Willamette Valley Council of Governments
8.	Kirk McCann
9.	USDI, Geological Survey
10.	Wildlife Management Institute
11.	Teresa Costanzo
12.	Trails Club of Oregon
13.	Oregon State Forestry Dept.
14.	Mazamas
15.	City of Salem, Mayor
16.	U.S. Environmental Protection Agency
17.	USDA, Forest Service
18.	Oregon State Dept. of Fish and Wildlife
19.	Frank O. Williams
20.	USDI, National Park Service
21.	Tom and Millie Bonebrake
22.	Linn Soil and Water Conservation District
23.	Thomas Basl
24.	Leonard Frank
25.	Frank Lumber Company, Timber Manager
26.	Bill Truax
27.	Cathie Olcott
28.	Sierra Club, Oregon Chapter
29.	Boise Cascade, Timberlands Manager
30.	Avison Lumber Company, Forester
31.	Mountain Fir Lumber Co., Division Forester
32.	Weyerhaeuser Co., Vice President Willamette Region
33.	John Grimm
34.	Thomas F. Haley
35.	Thomas F. Haley
36.	Dana Heuberger
37.	Duane Heuberger
38.	Walter D. Nichol
39.	Dick Schuetz
40.	Oregon Natural Heritage Program
41.	Vince Brand
42.	Monte Killingsworth
43.	Eugene Heuberger
44.	Mike Ohrt
45.	Oregon Equestrian Trails
46.	North West Timber Association
47.	Associated Oregon Industries
48.	Robert L. McNitt
49.	Shipler Logging Co., President
50.	John Timm
51.	Frank Moore
52.	W.B. Eubanks
53.	Brazier Forest Products, Timber Manager
54.	Pacific Northwest 4-Wheel Drive Association
55.	Clare Henness
56.	INA Corporation, Jean Haley
57.	The Nature Conservancy
58.	Pacific Wood Salvage
59.	Willamette Industries, Inc., General Manager
60.	Norman Marsh
61.	Plywood & Veneer Workers
62.	Melody Willard
63.	Karen Newberg
64.	Max Ekenberg
65.	Richard Beeby
66.	Third Force for Forestry, President and Vice President
67.	Bert and Betty Udell
68.	Morris Bergman
69.	Gary Hittle
70.	Publishers Paper, Timberlands Manager
71.	Melvin Rhoder
72.	Joe Birkenhead
73.	Joe Smith
74.	James Wick
75.	Jay Lamb
76.	Brice Hammack

Letter No.	Agency, Organization or Individual
77.	Calvin Bass
78.	David Lee
79.	Joe DiNucci
80.	Julia Day
81.	Les Wilkins
82.	Carl Tepper
83.	Paul Egan
84.	Linn County Board of Commissioners
85.	Reforestation Services, Inc.
86.	Lebanon Area Chamber of Commerce
87.	Kenneth Stapleton
88.	Gene Russell
89.	Donald G. Wagner
90.	Mr. and Mrs. Dennis C. Mack
91.	Susan Draper
92.	Joseph Weber
93.	Rick Weitman
94.	Gary Nokelby
95.	Western Forest Industries Association
96.	Gerald Gruber
97.	Association of O&C Counties
98.	Herb Hoffer
99.	Clackamas County, Dept. of Environmental Services
100.	USDI, Fish & Wildlife Service
101.	USDC, National Marine Fisheries Service
102.	Oregon Wilderness Coalition
103.	Cameron LaFollette
104 - 327, 393 - 407.	Clip and mail response forms distributed by Industrial Forestry Association, Western Forest Industries Association and North West Timber Association.
328 - 392.	Form letters from four different groups of respondents.
408.	Doug Paulz
409.	North West Timber Association
410.	Industrial Forestry Association
411.	USDA, Soil Conservation Service
412.	Oregon State Executive Department
413.	Seth Sladek, Paul Gwyn, Peggy Clark, Nicole Kehoe

Common Issues

Five issues were raised by a number of reviewers. These common issues and responses to them are presented below.

Common Issue 1 (response to comments 19-2, 25-5, 29-1, 30-1, 31-2, 41-1, 46-3, 59-1, 60-1, 64-1, 65-1, 67-1, 68-1, 76-2, 84-1, 95-1, 97-4, 102-16): The questions most frequently asked about the proposed action were how BLM could reduce the timber land base while increasing the allowable cut, and how availability of funding would affect BLM's ability to carry out planned intensive management.

Response: The allowable cut calculations for each alternative include "credits" for future gains in timber volume due to application of proposed intensive practices (see pages B-5 and B-6 and the allowable cut effect definition in the Glossary). Regardless of which allocation of withdrawn or constrained acres is selected, credits will be taken for future gains on intensively managed acres. Under the new preferred alternative, there would be a 38 percent increase in productivity attributable to intensive practices on 115,041 acres. This would result in a harvest of 24.1 MM bd. ft. more than the same land base would yield without intensive practices.

With regard to funding, the State Director is required to declare an allowable harvest as high as can be sustained through the use of all intensive management practices which are economically, technically and environmentally feasible. Once a timber management plan is approved, the declared allowable cut remains constant. However, the annual volume of timber to be sold will be reduced in any year where funding is insufficient to support the full level of management prescribed in the plan. If, in subsequent years, the funding is restored and it is silviculturally possible to make up the growth loss, annual sales offerings will be increased.

The estimated cost of implementing the new preferred alternative is displayed in Appendix N of the EIS.

Common Issue 2 (response to comments 29-2, 46-7, 46-9, 59-2, 68-2, 76-1, 95-6): Several writers commented that adequate old-growth wildlife habitat would be available after one decade under the maximum timber alternative.

Response: Although Alternative 1 has 7 percent less old growth than the new preferred alternative after one decade, Alternative 1 provides no assurance of maintaining the integrity of present old-growth ecosystems for wildlife habitat. Roads and harvest units placed in old-growth stands could make them ineffective as habitat for secretive species such as pine martin and fisher.

Common Issue 3 (response to comments 5-1, 8-1, 11-1, 28-5, 91-1): The adequacy of the buffer management proposal for Table Rock Trail was questioned by people who are concerned about visual impacts and timber blow-down.

Response: Approximately one-half of Table Rock Trail passes through lands withdrawn from the timber production base due to their fragile soils and low productivity. The remaining half of the trail passes through land from which timber would be harvested at a rate of 10 percent per decade. The trail would be buffered from timber harvest activities.

The proposed trail buffer would vary in width from 300 feet at the trail head to 1,000 feet at higher elevations. The buffer is comprised of short, small-crowned trees which are considered wind firm. Because the predominant wind pattern for the area is southwest to northeast, some wind throw could be expected adjacent to harvest units on the north or northeast (leeward) side of the ridge system. Damage is expected to be light, however, since protection would be afforded by the buffer extending some 200 to 500 feet down the ridge. Harvest units on the south and southwest side of the ridge system would be narrow, and unit boundaries would not be perpendicular to the wind. Small (3- to 5-acre) skyline units are proposed for this area.

The sample 5-year timber sale plan for this area shows three harvest units located within one-half mile of the trail. The nearest unit is 400 feet from the trail (250 feet from the edge of the buffer), and the farthest unit would be 700 feet from the trail (450 feet from the edge of the buffer). Regardless of the final outcome of the sale plan for the coming decade, efforts would be made to design harvest units in such a way that their boundaries would be wind firm.

Common Issue 4 (response to comments 10-1, 25-2, 66-2, 67-2, 84-2, 86-2): A number of questions dealt with the feasibility of ecosystem management, a new concept proposed for BLM-administered lands.

Response: The ecosystem corridor concept is described on page 1-6 and in Appendix D.

The original ecosystem management proposal by BLM wildlife biologists (Alternative 4) is based on extensive review of scientific literature. As a means of maintaining all wildlife habitat components and avoiding genetic isolation, the proposal is logical and supported by other wildlife professionals. Actual application is somewhat flawed due to larger than desirable gaps between some BLM-administered lands, but in general, the proposed distribution of large and small blocks is adequate to meet wildlife objectives.

The corridor concept included in the new preferred alternative is a modification of the Alternative 4 proposal. It would involve less land but would achieve the essential objectives of ecosystem management, which include protection of habitat for secretive and/or wide-ranging species.

A solid land jurisdiction pattern is not required for ecosystem management. As long as some mid-age (125-200 years) and old-growth (200+ years) forest stands are fairly well distributed on public lands, the concept is viable. In fact, the intermingled younger age classes on public and private lands are compatible with the concept.

With regard to the experimental nature of this particular concept, it is the best available methodology to meet the objectives of timber and wildlife management. Nothing about the concept can be proven until land allocations are made and wildlife behavior is observed over time. Also, no other alternatives which would achieve the same long-range wildlife objectives have been suggested to date.

Common Issue 5 (response to comments 31-1, 32-4, 66-1, 86-1, 97-1): A number of commentors raised the question of BLM's authority to implement certain of the resource management actions included in the original proposed action and some of the alternatives because of suggested requirements of the O&C Act of August 28, 1937 (43 U.S.C. Sec. 1181 a., et seq.).

Response: To answer this question, a draft policy statement was prepared by BLM and submitted to the Interior Department Solicitor. In September 1981, the Solicitor issued an opinion on this draft policy which indicates that BLM has considerable discretionary authority in developing its final policy statement and may choose certain uses over others. The O&C Forest Resources Policy has been revised (see Appendix A). The new preferred alternative is based on the final policy statement.

2

United States Department of Agriculture

Forest Service

Columbia Gorge RD

31520 SE Woodard Rd
XXXXXXXXXXXXXXX
Troutdale, OR 97060

Reply to 2410

Date Feb. 3, 1982

Salem District Manager
Attention: EIS Team Leader
Bureau of Land Management
PO Box 3227
Salem, OR 97302

Gentlemen:

In reference to the Draft EIS for Timber Management, Eastside Salem.

2-1 In our initial review we noted that on pages 2-4 & 3-9 there are tables referencing Municipal Watersheds. Each of these tables list BLM ownership of 70 acres in Portland's watershed. This reference is in error. The boundary of the Bull Run Watershed was changed in 1977, with passage of Public Law 95-200, by the Congress. The lands in question, in section 11, T.2S., R.5E., are south of the boundary which is the Little Sandy River.

Enclosed is a map of the revised watershed boundary.

Sincerely,

for GENE ZIMMERMAN
District Ranger

FS-6200-11(8-80)

Response to comments in Letter 2.

2-1 The 70 acres referred to in the EIS as being in Portland's watershed are located in the SE¼, Section 13, T. 1 S., R. 5 E. While these lands are not included in the Bull Run Watershed legal boundary established by Public Law 95-200, they lie within the physical boundary of the watershed, i.e., they drain to Bull Run River above the City of Portland's municipal intake.

4

salem

CITY OF SALEM, OREGON
City Hall / 555 Liberty St. S.E.
Zip Code 97301

February 19, 1982

Salem District Manager
Bureau of Land Management
P. O. Box 3227
Salem, Oregon 97302
ATTN: Bob Saunders,
EIS Team Leader

RE: Draft Eastside Salem Timber Management EIS

Dear Bob:

As you know this city is very interested in any land management activities which take place within the North Santiam River drainage basin. I was pleased to note the concern for protection of the water resource which the BLM showed in this document in all situations except one.

4-1 The one item of some concern to me is the BLM's reliance upon dilution of larger streams to mitigate the effects of slash burning activities that cause degradation of water quality in small streams. A statement evidencing this attitude is found in clear text on pages 3-7 and 3-8 of the Draft Eastside Salem Timber Management EIS.

It is my opinion that no one should rely upon dilution of larger streams to clean up their problems. If everyone used this gambit and since the large streams drain properties of numerous owners the larger streams could be severely impacted. Water discharged from BLM lands should meet the standards of the State.

Sincerely,

DEPARTMENT OF PUBLIC WORKS

David D. Wiley
David D. Wiley
Management Analyst

DDW/nrc

cc: Ronald J. Merry, Director of Public Works
B. T. VanWormer, Assistant Director of Public Works

Response to comments in Letter 4.

4-1 The effects of slash burning on water quality are not well documented in the literature. The statement in the EIS that slash burning could cause the ammonia and manganese concentrations of some first order streams to exceed recommended levels is based on Fredriksen's (1971) study of one slash burn in the Oregon Cascades. In that study, the slash burn was extinguished by precipitation, causing high concentrations of ammonia and manganese in the runoff from the burn area. No other literature documents chemical water quality exceeding recommended levels following clearcutting and burning. For this reason, the extent of this impact is unknown. As funding permits, water quality would be monitored in association with several slash burns over the next decade. If water quality standards were exceeded, the conditions of the burn would be evaluated, and mitigating measures would be developed for future burn prescriptions.

6

CITY OF
PORTLAND, OREGON
BUREAU OF WATER WORKS

Francis J. Ivancie, Mayor
Carl Goebel, Administrator
1800 S.W. 6th
Portland, Oregon 97201
(503) 248-4178

February 22, 1982

Mr. Saunders, EIS Team Leader
Bureau of Land Management
P.O. Box 3227
Salem, Oregon 97302

Dear Mr. Saunders:

This letter is written in response to review of the document titled Eastside Salem. Draft Timber Management Environmental Impact Statement, Oregon State Office received by the City of Portland, Bureau of Water Works on February 4, 1982.

As you are probably aware, the Bull Run is the sole source of water for the Portland Metropolitan area. Except for chlorination, Bull Run water receives no further treatment. The Water Bureau is, therefore, extremely interested in the types of land management practices carried out in the physical drainage of the Bull Run River.

Generally, I am concerned over the lack of information provided on management policies to be applied on the 70 acres of land administered by the BLM within the physical drainage. (See table 2-3, Municipal Watersheds, on page 2-4.) Table 3-4, BLM - Administered Lands in Municipal Watersheds Proposed for Harvest in the Sample 5-Year Timber Sale Plan, on page 3-9 makes it clear that none of the 70 acres are proposed for timber harvest in (I assume) the initial 5-year period covered by the 10-year plan. However, nothing in the document speaks to the level or appropriateness of other intensive forest management practices that might be carried out on these 70 acres, such as application of herbicides or fertilizers, use of crawler-tractor type vehicles or portable toilets by logging crews, enforcement of trespass regulations, etc. 6-1

The vast majority of the land in the Management Unit is administered by the U.S. Forest Service under the terms of the 1979 Bull Run Final Environmental Statement. The City of Portland would encourage a land transfer between the BLM and the Forest Service to bring this portion of the Physical Drainage under the administrative control of the Forest Service. Until such time, the City of Portland would very much like to pursue entering into a cooperative agreement with the BLM that would provide for the same general level of management on the BLM land that is practiced on Forest Service and City lands in the Bull Run. This would include coordination with and input to the Environmental Assessments that the draft EIS says will be completed prior to various forest development projects (page 1 - 21).

I would like to meet with you at your convenience to discuss this issue. Perhaps personnel from the Mt. Hood Forest Service should be involved as well.

Sincerely,

Carl Goebel, Administrator

Bruce Niss,
Watershed Resources Advisor

CG:BN:nk

c: Gene Zimmerman,
Columbia Gorge Ranger District
Mt. Hood National Forest

Response to comments in Letter 6.

6-1 With respect to the 70 acres of BLM-administered land in the Bull Run watershed, logging activities would be restricted to the period of June 15 through September 30; the Portland Bureau of Water Works would be notified prior to preparation of burning, fertilization and herbicide application plans; all forest management activities would be reviewed with the Bureau of Water Works prior to implementation; use of portable toilets would be required when working in the physical drainage area; and the access road would be gated at the powerline.

9

United States Department of the Interior
GEOLOGICAL SURVEY
RESTON, VA 22092

FEB 2 4 1982

Memorandum

To: Salem District Manager, Bureau of Land Management
Salem, Oregon

From: Acting Assistant Director for Resource Programs

Subject: Review of draft environmental statement for Eastside Salem timber management, Oregon

We have reviewed the draft statement as requested in your letter.

9-1 The statement should address the potential for impacts of the proposed plan on ground-water resources. It should consider effects of the various methods of timber harvest on infiltration of recharge to ground-water reservoirs, on ground-water levels, and on related baseflow of streams. Possible effects on ground water from sanitation, sewage disposal, and garbage facilities should be considered. The assessment should also discuss monitoring of drinking-water supplies, effects of herbicides on ground water, consumptive use of ground water by vegetation, and effects of logging roads on ground-water flow and discharge. The sections on the possibility of impacts of herbicides on human health and on surface water (p. 3-8, 3-38, 3-39) should include a spill-disposal plan.

Robert L. Wesson

Response to comments in Letter 9.

9-1 The primary impacts of timber management on groundwater resources would be decreased infiltration in areas of soil compaction, reduced consumptive use of groundwater by vegetation (evapotranspiration) in clearcut areas, and associated increases in base flow (low flows). See page 3-2 for a discussion of soil compaction and page 3-6 for a discussion of evapotranspiration and low flows. With careful road location, logging roads would have an insignificant effect on groundwater resources.

Impacts on groundwater quality due to road construction, logging and burning would generally be low. While some chemical elements could become more mobile in shallow groundwater following removal of vegetation, instream concentrations would rarely exceed recommended levels. Herbicides are not considered a hazard to groundwater because of their limited mobility in the soil.

Domestic and municipal drinking water supplies are monitored for herbicide residues in accordance with policy set forth in the 1978 EIS, Vegetation Management with Herbicides - Western Oregon (BLM, 1978b). In addition, the Salem District Herbicide Spray Program Implementation Plan contains an accidental spill contingency plan with procedures for containment, clean-up and disposal of herbicide spill material.

10

Wildlife Management Institute

709 Wire Building, 1000 Vermont Ave., N.W., Washington, D.C. 20005 • 202 / 347-1774

DANIEL A. POOLE
President
L. R. JAHN
Vice-President
L. L. WILLIAMSON
Secretary
JACK S. PARKER
Board Chairman

February 25, 1982

Salem District Manager
Attention EIS Team Leader
Bureau of Land Management
Post Office Box 3227
Salem, Oregon 97302

Dear Sir:

The Wildlife Management Institute is pleased to comment on EASTSIDE SALEM, DRAFT TIMBER MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT, Oregon.

We commend the Salem District for its recognition of multiple use, vegetative diversity and wildlife needs. The plan covers at least minimum standards for all three.

The plan could be improved in some respects. Naturally, we prefer Alternative 4, "Strong emphasis on enhancement of wildlife and other non-timber values." It is not very likely that alternative will be adopted on O & C lands. Therefore, we suggest an increase in the old-growth stage, first decade and fifth decade, for the preferred alternative to approach the acres proposed in Alternative 4. (page 1-18)

10-1 We are familiar with the corridor concept; however, many readers may not be. An explanation should be included, as should a map of possible or tentative corridor locations.

The impacts appear to be well stated and analyzed.

We appreciate publication of the solicitor's opinion of September 8, 1981. It should be followed and used as the management guide for O & C lands.

10-2 Descriptions of the Decision Document (last paragraph, 1st page of covering letter and p. 1-20) are not satisfactory. This leaves the door open for a decision composed of bits and pieces from several alternatives, that could be far removed from the preferred alternative in the final environmental impact statement. Any differences from that preferred alternative should be clearly labeled, and any extensive differences should be given a public review and comment period.

DEDICATED TO WILDLIFE SINCE 1911

Salem District Manager -2- February 25, 1982

Some specific comments follow:

10-3 p. 1-4, Proposed Action, 1st Par. "A time lag of 5-7 years before harvest of adjacent clearcut units would be applied where possible." This is not satisfactory. Time between clearcuts must be based on hiding cover (vegetative height) and in some instances thermal cover. The words "where possible" negate the 5-7 years specified.

p. 1-7, 1st Par. What will be the range in size and the distribution of old growth blocks? The reader should not have to go to the appendix for this critical information.

10-4 p. 1-13. What will be effects of wind throw on these tiny (1-3 acre) clearcuts?

10-5 Table 1-5. Information on percent of the BLM land in each vegetative type should be included here or listed in an adjacent table. This data is contained in Tables 2-4, 2-5 and 2-6. Numbers here do not agree with the percent we computed from Table 1-5. For example, we computed 17 percent old growth from Table 1-5. Table 2-5 gives 19 percent. Please reconcile these figures.

p. 1-15. The statement on maintaining the gene pools while using genetically improved trees is good. This statement should be featured and titled, not buried in a section labeled "planting."

These remarks have been coordinated with William B. Morse, the Institute's Western Representative.

Sincerely,

Daniel A. Poole

Daniel A. Poole
President

DAP:lbb

Response to comments in Letter 10.

10-1 See Common Issue 4.

10-2 Differences between the draft EIS proposed action and the final EIS new preferred alternative are described on pages 1-6, 1-9 and 1-10 of this document. These differences, along with all other items in the Final EIS, are open to a 60-day public review and comment period. If the decision differs from the new preferred alternative, the differences will be described in the record of decision.

10-3 In order to maintain the new preferred alternative allowable cut and meet other resource management objectives (no planned harvest on 15,656 acres, constrained harvest on 7,696 acres), spacing of clearcuts to benefit big game would not always be achieved on intensively managed timberlands. The sample 5-year timber sale plan shows that timing between harvest of adjacent clearcuts would be 5-7 years under the new preferred alternative. The phrase "where possible" recognizes the probability of less time between harvest of adjacent clearcuts in the future.

10-4 Wind throw in small clearcuts would be kept to a minimum using design features.

10-5 Tables 1-5 and 2-4 list 27,300 acres of old growth under the existing condition. In Table 2-5 this acreage was divided by the total acreage of forest land in the Eastside SYUs (148,078 acres), yielding 18.4 percent. This was subsequently raised to 19 percent so that acreage figures in the table would total 100 percent.

VICTOR ATIYEH
GOVERNOR

Forestry Department
OFFICE OF STATE FORESTER
2600 STATE STREET, SALEM, OREGON 97310 PHONE 378-2560

March 3, 1982

Joseph Dose, District Manager
Bureau of Land Management
P.O. Box 3327
Salem, Oregon 97302

Dear Mr. Dose:

13-1 The Oregon State Forestry Department has reviewed and analyzed the Eastside Salem District Draft Timber Management Environmental Impact Statement. The Forestry Department is concerned with the proposed action because it is inconsistent with the Board of Forestry policy as expressed in the Forestry Program For Oregon (FPFO). These inconsistencies are described below.

The proposed action allowable cut, although it is a 5.6% increase from the existing allowable cut, is not large enough to constitute the Eastside Salem District's "fair share" target of 97 MMBF as presented in the 1980 Oregon Timber Supply Assessment. The proposed action, by reducing the commercial forest land base by 6.6% is also inconsistent with Board policy.

Although the proposed action does not go far enough to meet future predicted timber supply shortages, it is a step in the right direction. The Forestry Department urges the Eastside Salem District to reconsider alternatives 1, 2 or 3. These alternatives would increase the Eastside Salem District's ability to meet future timber supply shortages.

We appreciate your coordination efforts on this plan.

Sincerely,

H. Mike Miller
State Forester

HMM:SJ:jp
cc: Board of Forestry
Executive Staff
Congressional Delegation
Pat Amedeo
Doug Coyle
William Leavell, BLM State Director
State Clearinghouse #OR820127-092-4

Response to comments in Letter 13.

13-1 None of the alternatives, including maximum timber production, would approach the FPFO target of 33.0 MM cu. ft. in the first decade or the FPFO target of 28.8 MM cu. ft. in the 10th decade.

18

VICTOR ATIYEH
GOVERNOR

Department of Fish and Wildlife
506 S.W. MILL STREET, P.O. BOX 3503, PORTLAND, OREGON 97208

March 11, 1982

Mr. Joe Dose
Salem District Manager
Attn: EIS Team
Bureau of Land Management
P.O. Box 3227
Salem, Oregon 97302

Dear Mr. Dose:

Attached are the comments of my staff based on review of the Draft Environmental Impact Statement of timber management in the Eastside Salem sustained yield units.

The planning efforts of the Bureau of Land Management and other public land management agencies are vital to the success of Oregon's fish and wildlife program and I want to compliment you and your staff for the effort that you are devoting to such an important task. Although we may not always agree on the particular alternative selected, I trust that you understand our role is to assure that the predicted impacts of any land management decision are defined on the basis of our best judgement, since that is our responsibility. At the same time, I appreciate that the final decision rests with the land manager.

Sincerely,

John R. Donaldson, PhD
Director

JRD:dlw

Attachment

cc: State Clearinghouse, Intergovernmental Relations Division

Oregon Department of Fish and Wildlife

Comments on
Bureau of Land Management
Eastside Salem Timber Management DEIS

March 11, 1982

PNRS 820127-092-4

After staff review of the draft EIS, we would like to see the following items clarified or addressed in the final EIS. The items are of significant concern to the Department.

General Comments -

The BLM should be commended for including the solicitor's opinion on management of O & C lands. The conclusion of the solicitor that the Act "requires management for other interests as well as timber supply" and that "the bureau must meld forest proction with aspects of multiple use in the O & C Act in addition to requirements in subsequent legislation" should support a land use plan based on multiple use and ecosystem management.

18-1 While the O & C Act may apply to about 90% of the BLM land covered by the plan, approximately 10% of the land is Public Domain. Public Domain lands are to be managed in closer compliance with Federal Land Policy and Management Act of 1976. Review of the DEIS did not reveal any distinction in management proposals between Public Domain and O & C lands. Shouldn't there be differences in the management schemes between the two land classifications?

18-2 Executive order 11990 and 11988 speak specifically to wetland and floodplain management. Those executive orders need to be addressed in the FEIS. The level of protection for wetlands should be displayed in the alternatives.

18-3 The DEIS needs to list which alternatives will or will not maintain viable populations of all species of wildlife that exist on the BLM lands covered by the DEIS. The Department recommends that the alternative selected be one that at least maintains viability of all native species within the planning area.

Specific Comments -

18-4 Riparian zones will be protected on all third order and larger streams and on second order streams with fish (p 1-4). The text needs to indicate how wide the zones are, and the amount of riparian zone due to be lost to road construction and yarding corridors. Management guidelines for riparian zones should be identified in the final document.

18-4 What management practices will be permitted in riparian zones on first and second order streams without fish? Table 1-3 does not indicate any protection to riparian zones in the proposed action or alternatives 5 and 6. Is Table 1-3 in error?

18-5 The draft EIS states on page xvi that 10 spotted owl locations would be preserved by the proposed action (based on assumption that 300 to 900 acres/location is adequate protection). A definition of the 300 to 900 acres/location is not provided in the DEIS. Therefore, the following definition from the Oregon Interagency Spotted Owl Management Plan is needed:

> "On each site managed for a pair of owls maintain an old growth core area of at least 300 acres around the nest and an additional 700 acres of old growth within a 1.5 mile radius of the nest. If 1,000 acres of old growth does not exist within a 1.5 mile radius of the nest, then substitute the oldest stands available and manage them in the same manner as old growth."

18-6 Page 1-4 refers to the spacing of clear cuts under the oroposed action: "A time lag of 5-7 years before cutting adjacent areas will be applied when possible. Also regarding spacing (pg. 3-18, para. 1) spatial objectives will not be met on 37% of anticipated sale locations and size of cuts will exceed 40 acres and 7% of the sales. Please evaluate the effects of this reduction in hiding cover on big game populations with reference to wildlife management objectives.

18-7 Page 3-5, third paragraph, indicates the proposed action will have an irretrievable loss of soil productivity on 750 acres within a 5 year span. How many acres have already suffered an irretrievable loss of soil productivity and how much will be lost in the next 50 years? The issue is of increased public awareness since recent storms have resulted in many mudslides on forestlands and severe damage to fish habitat in Western Oregon.

18-8 Page 3-15, second paragraph, states "Riparian habitat conditions would be enhanced..." The statement may be true in the long term after previously damaged habitat restores itself; but, road corridors are still to be constructed in riparian zones and no protection will be afforded riparian zones on 1st and 2nd order streams. Riparian habitat conditions are more likely to be partially restored than enhanced under the proposed action.

18-9 Page 3-16, Table 3-6 indicates deer populations will remain comparable to existing populations under any of the alternatives presented. While deer do adapt to a variety of cover conditions, their population density would fluctuate depending upon forage supply, cover quality, herbicide use, road access and clearcut distribution for example. Successful reforestation techniques that rapidly reestablish vigorous tree seedlings shortens the forage producing years of a clearcut, thereby depressing deer numbers. It is suggested that deer numbers under all alternatives will be less than existing numbers. Given the information in the DEIS, we cannot quantify the adverse impacts on deer, but would expect the impacts to be less with Alternative 4, 6 and the preferred alternative. Adverse impacts would be greatest with Alternative 1. 18-9

18-10 Page 3-19, second paragraph clearly describes future problems for snag dependant wildlife. The discussion on snags indicates the BLM has a policy of leaving 1.8 snags per acre but actual retention is only 0.2 snags per acre. At what density will snags be provided in the future?

18-11 Page 3-21 and 3-22, indicates that proposed alternative will increase sediment in localized stream reaches. This statement appears to play down the impacts. The statement conflicts with page 3-23, last paragraph, which indicates 5 miles of road will be built on fragile or unstable soils resulting in significant adverse impacts to adjacent and downstream fish habitat. Also mentioned are 97 stream crossings and 25 roads in headwall areas which would cause both short and long term adverse impacts. Please reevaluate the proposed action thoroughly to determine if the impacts can be further minimized. What mitigative measures will be employed to correct these unavoidable impacts? 18-12 Why are there no timber harvest constraints on fragile sites (table B-3) recognizing the potential for adverse impacts on water quality, soil and fisheries productivity.

18-13 Page 3-24, Table 3-9 indicates the proposed action will protect 10 locations for spotted owls. As mentioned in the DEIS, revised habitat requirements are more restrictive and would protect only two locations. If the present standards prove inadequate and the number of spotted owl pairs drops from 29 known pairs to 2 pairs, what would be the impact on the viability of this species on BLM land?

Response to comments in Letter 18.

18-1 The Bureau agrees that the management of Public Domain is governed by FLPMA. The land-use planning process for Eastside Salem considered all BLM-administered lands as a single entity without regard to underlying land status. This was a multiple-use process which did not rule out consideration of any resource or value. This process is reflected in the multiple-use aspects of the new preferred alternative.

18-2 The text has been revised in the FEIS, Chapter 1, Alternatives section and Chapters 2 and 3, Vegetation, Wetland and Aquatic Vegetation section. These revisions provide more details regarding wetland values and protection measures.

18-3 The text has been revised in the FEIS, Chapter 3, Impacts on Animals, Terrestrial Animals section. A discussion of impacts on the viability of native species has been added.

18-4 The text has been revised in the FEIS, Chapter 1, Alternatives section, to include more specific information on management of riparian zones.

Table 1-3 in the FEIS shows riparian zone acres in no planned harvest and constrained harvest categories.

18-5 The Oregon Endangered Species Task Force recommendations for spotted owl management are summarized on page 3-25.

18-6 The text has been revised in the FEIS, Chapter 3, Impacts on Animals, Terrestrial Vertebrates, Timber Harvest section.

18-7 The cumulative number of acres upon which soil productivity has been lost and the acres upon which soil productivity would be lost in the next 50 years cannot be estimated with confidence. The greatest impacts on soils occurred during the 1940's and 1950's. During that time, yarding roads and closely spaced access roads were used on a large scale with little concern for slope stability or the proper disposal of excess materials. During the 1960's and 1970's, greater spacing was generally maintained between access roads, use of suspension yarding systems increased, tractor yarding declined, and roads were constructed with greater attention to location and material disposal. In future decades, road construction will be substantially reduced, and more reliance will be placed upon long-reach yarding systems. As a result, impacts on soils are expected to decrease.

18-8 Riparian zones along first and second order streams without fish would be managed to meet or exceed Oregon Forest Practices Act rules. The statement "Riparian habitat conditions would be enhanced" is relative to existing riparian zone conditions. The new preferred alternative would protect 75 percent of the vegetation in these zones.

18-9 The difference in final harvest levels between continuation of the present program (Alternative 7) and the maximum harvest alternative (Alternative 1) is about 4,600 acres per decade, or 460 acres per year. This difference, spread over a total land base of 159,898 acres, would be expected to create insignificant impacts on deer populations.

18-10 Under the new preferred alternative, snags would be maintained within areas designated for old-growth management, riparian zones, recreational areas and similar "no planned harvest" allocations. BLM would attempt to maintain an average of two standing snags per harvested acre, though worker safety and fire protection rules would make this goal difficult to attain.

18-11 The statement that "... the proposed action... would not increase sediments over present levels except in some localized stream reaches" refers to the entire land base of the SYUs over the next five decades. Viewed broadly over space and time, increases in sediments are expected to be negligible. Within specific drainages, impacts from sedimentation may be significant and may persist for a relatively long time.

The text has been revised in the FEIS, Chapter 3, Impacts on Animals, Fish section. Measures that would be used to mitigate impacts of roads at stream crossings and on fragile sites have been added.

18-12 Table B-2 shows only timber volume forgone due to land use allocations affecting the timber production base. Fragile lands were removed from the timber production base prior to the land use allocation phase under all alternatives (see Table 1-3, No Planned Timber Harvest).

18-13 If 1,000 acres of old-growth habitat are necessary to support one spotted owl pair, and if BLM's prediction regarding the decline in owl numbers is true, the viability of the population on BLM-administered land in the EIS area would be very questionable.

19

March 11, 1982

Salem District Manager
Attention: EIS Team Leader
Bureau of Land Management
P.O. Box 3227
Salem, Oregon 97302

Dear Sir:

I would like to comment on the DEIS for the Eastside Salem District. I feel that the best alternative would be a modified version of alternative 1. This would consist of taking alternative 1 and withdrawing the acres for fragile sites, reforestation, visual resource and riparian zones. This would result in a land base for timber harvest equal to the current management plan. This would result in an additional 1,600 acres of harvest over the next 10 years, compared to the proposed action. I feel that it is very important to maintain the current level of acres available for timber harvest and management.

I am also concerned about the way the DEIS was prepared and presented. We (the general public) don't have time to do a detailed analysis on how the DEIS was compiled and put together. This means that the BLM planning staff has responsibility to present the facts in an easy to understand format.
19-1 | Basing the actual harvest on the last three years and not including the acres sold but not harvested because of market conditions is very misleading. Showing 11,763 acres constrained for wildlife habitat hides the fact that the acres are being managed on a 350 year rotation which effectively withdraws those acres from the timber harvest base.
19-2 | Basing future volumes on a 40% increase in funding for intensive forest management activities is assinine in the current economical situation. One can only wonder how many other items were manipulated to promote the ideas of the BLM planning staff.

Sincerely,

Frank D. Williams

Frank O. Williams
1008 Dixie Drive
Springfield, Oregon 97477

Response to comments in Letter 19.

19-1 The current timber harvest level was used as a base for impact determination to explain the impacts in relevant terms. The portion of local employment and income currently attributable to the existing management program was estimated as a function of harvest volume on the assumption that related employment in lumber mills and other industries occurs in approximately the same period as the logging employment. The impacts of prospective programs compared with recent conditions are more real than comparisons with average conditions during the entire previous decade or with hypothetical conditions representing the jobs and income which would be generated when and if sales are harvested.

19-2 See Common Issue 1.

OREGON PROJECT NOTIFICATION AND REVIEW SYSTEM 22

STATE CLEARINGHOUSE

Intergovernmental Relations Division
155 Cottage St NE , Salem, Oregon 97310
Phone Number: 378-3732

RECEIVED
JAN 28 1982
STATE SOIL AND WATER
CONSERVATION COMMISSION

PNRS STATE REVIEW

Project #: OR 8201-032-4 Return Date: MAR 0[illegible] 1982

ENVIRONMENTAL IMPACT REVIEW PROCEDURES

If you cannot respond by the above return date, please call to arrange an extension at least one week prior to the review date.

ENVIRONMENTAL IMPACT REVIEW
DRAFT STATEMENT

( ) This project has no significant environmental impact.

( ) The environmental impact is adequately described.

(✓) We suggest that the following points be considered in the preparation of a Final Environmental Impact Statement.

( ) No comment.

Remarks

The Linn Soil & Water Conservation District supports the proposed action (preferred alternative) of the draft Timber Management EIS for Eastside Salem, with the following additions:

1. Fertilizer can be used with any alternative and should be spread on all high site land, regardless of the selected alternative.
2. 22-1 | Adverse impacts on wetlands due to timber harvest or road construction can and should be addressed prior to laying out and selling timber from a parcel. Important wetlands should be preserved.

For additional assistance, please contact the Linn SWCD.
LINN SWCD
33935 Hwy. 99E
Tangent, OR 97389
Phone: 967-5927

Agency Soil & Water By

Response to comments in Letter 22.

22-1 See response to comment 18-2.

25

FRANK LUMBER CO. INC.
Equal Opportunity Employer
P. O. BOX 1467 MILL CITY, OREGON 97360
PHONE (503) 897-2371

March 17, 1982

Bureau of Land Management
Salem District
P.O. Box 3227
Salem, Oregon 97302

Subject: Eastside Salem Draft EIS

Attention: Joe Dose, Manager

Gentlemen:

After serious study of your proposed management alternatives, I find that some of the very important economic related questions asked by concerned citizens early in the planning program have still not be addressed. This is most unfortunate. 25-1 What is the relative cost of maintaining one pair of spotted owls under your preferred alternative? Where does community stability and the value of community support through timber related jobs enter the BLM picture?

The O & C Act of 1937 is discussed in this Draft and clearly shows that the Law has been stretched to cover "multiple use" resources of great variety. Throughout the discussion, no one can generalize away the important fact that timber production on revested O & C Lands is cardinal in importance as a management objective. It is possible and practical to have intensive timber management with fully aligned timber harvest and in addition have pure water, abundant desirable wildlife habitat, excellent recreational opportunities and even good visual attributes all on the same land. Why must each resource advocate pull his particular area aside for some special purpose of land and timber preservation? We have more wildlife at the present time than perhaps any period in the past and mostly, this has developed in or adjacent to intensively managed private and public forest lands. 25-2 What is the BLM trying to prove by retaining vast old growth forest areas aligned in strips? We must bear in mind that nature has provided us with very little 200 years or older timber on BLM land between the North Santiam and the Columbia.

25-3 Chapter 3 of the Draft EIS discusses Environmental Consequences and talks a lot about fragile soil. Table 3-1 and other information result from a definition of fragile soil. What is a concise practical definition? The fragile soil impacts on timber yield and harvest, on water quality, etc., are misrepresented in this Draft EIS. 25-4 Also, table 3-14 and developing verbage generalizes far in advance of data in presenting probable long-term changes in visual resource conditions.

MANUFACTURERS OF K. D. WEST COAST HEMLOCK ✣ DOUGLAS FIR

Posekany
page 2
3/17/82

25-5 The BLM preferred alternative, in brief, purports to reduce the intensive timberland base by 17,428 acres, increase the acres of No planned harvest by 8,176 acres, increase the acreages of "Constrained" timber management by 8,817 acres, convert only 43½ acres of hillside alder to coniferous forest per year and yet somehow slightly increase the allowable harvest. This is simply not coherent or practical forecasting that cannot be supported.

Table 1-5 clearly states that the BLM preferred alternative would provide 809 fewer industry jobs than that possible under maximum timber Alternative #1. In consideration of industry and community jobs, community stability, shrinking intensively managed forest land base and a whole load of other important aspects for the people of Oregon and the nation, the BLM preferred alternative cannot be justified. There is much more overall benefit to the citizens of this nation and I personally support Draft EIS Alternative #1 Maximum Timber Production which will also provide all the other resources in very reasonable levels simultaneously.

Sincerely,

Dick Posekany

Dick Posekany
Timber Manager

mmb

Response to comments in Letter 25.

25-1 The intent of ecosystem management under the new preferred alternative is not merely to protect spotted owls. Old growth provides many "values", including optimum habitat for 62 species of animals, habitat for numerous native plants and conditions for maintaining the highest water quality. The "costs" of impacting these values are immeasurable. In terms of annual timber harvest benefits, the 8.9 MM bd. ft. that would be foregone for mid-age and old-growth forest (see page B-4) equates to 269 jobs and $3.6 million in earnings.

25-2 See Common Issue 4.

25-3 See Glossary - Fragile Soils.

The estimates of impacts related to soils are based upon field studies which measured soil losses resulting from various logging practices. Most of the data was collected by monitoring projects within the Salem District. Other data were derived from research on nearby areas conducted by Oregon State University and the Pacific Northwest Forest and Range Experiment Station.

25-4 An essential part of any EIS, and also one of the most difficult, is predicting impacts of the alternatives on all affected resources. Since visual resources are affected by timber management, the best available methodology was used to assess impacts. The assessment is based on: (1) qualitative evaluations of scenery quality by Salem District staff and managers; (2) quantitative measures of sensitive viewing areas; (3) observations of past resource management impacts; and (4) comments from members of the public who are concerned about visual resources. Given the data from these sources, visual impacts would occur unless mitigated through visual resource management. With the exception of Alternative 1, each alternative would provide a different set of land allocations and management prescriptions to mitigate visual impacts. The impact levels are displayed in Table 3-14. Details of the visual resource analysis are available for public review in the Salem District Office.

25-5 See Common Issue 1.

27

4094 Lucille Ave. SE
Salem, OR 97302
March 17, 1982

Salem District Manager
Attention EIS Team Leader
Bureau of Land Management
P.O. Box 3227
Salem, Oregon 97302

Dear Sir:

Than you for including in the Eastside Salem Timber Management EIS the memo from the BLM Solicitor's office regarding BLM management policy on O & C lands. We must never forget that it was orignally enacted with conservation intent when we are planning the use of our forests.

The Act clearly states the stipulation to "...limit calculation of the allowable cut to lands which have the capacity to provide a sustained yield of timber".(A-7). This automatically removes exposed ridges, unstable soils, wetlands,etc. from the allowable cut base.

At the Salem meeting on the evening of March 2, even the timber harvest representatives agreed that Alt. I is illegal, and asked why no alternative had been developed addressing maximum harvesting on a base which excluded TPCC withdrawn lands. By presenting Alt. I on all the charts, one is led to believe that this alternative is legitimate and any acreage less than the 142,000 set aside for intensive timber management is a compromise; this is not so.

27-1 Another concern is difficult to explain but will be increasing over the years; a contrast between Alt. 1 and Alt. IV will serve as an example: Under Alt. I, about 850 acres of land more than in Alt. IV would be lost to productivity by soil disturbances (xv). How much timber would these 850 acres produce--timber that would be lost under Alt. I. Also, that 850 acre loss would continue not only for the decade of this EIS but for at least 30 years if the loss is due to compaction, or for forever, if lost by erosion. With any type of management, there is an accumulative loss of acreage from productivity. This problem will affect the allowable cut and needs to be addressed in the planning process and identified in each EIS.

27-2 We should also take a better look at air quality. What amount of slash has been burned in the past? There is a great deal of difference between burning 7,707 acres (Alt. IV) and 15,260 acres in Alt. I. This would greatly affect air quality.

I heartily support Alternative IV. It guarantees the widest diversity of plant and animal species; the highest quality of air and water; highest recreational and scenic opportunities; protection of resources with future potentialities with a loss of revenue to counties amounting to the equivalent of only .3 of 1% of total property tax levies. If Alternative IV is adopted and site preparation and plantation maintenance were performed manually, loss of 27-3 timber harvest jobs would be ameliorated. The staff report citing the much higher yield from manually controlled planting sites than originally forecast should be publicized.

To further address future economic considerations pertaining to O&C lands:

1. The greatest long-term benefit to O&C areas would be a diversified sustained yield forest offering long-term, stable employment and consistent reimbursement to the O&C counties.

27-4 2. What will happen if present economic factors continue (high interest rates, refusal of contract extensions, short contract sales, recession)? How will these factors affect the Timber Management Plan?

3. Houses of the future will be smaller, constructed of less substantial lumber and timbers; there will be more multiple-family residences that utilize concrete and other building materials.

4. What protection will be given our lumber sales from Canadian or other foreign producers?

5. Our national population is declining steadily and the percentage of poor is steadily increasing; both factors need consideration in planning future housing needs.

6. Excess packaging, recycling, and use of other materials for packaging will affect future wood products demand.

7. Oregon is changing; becoming more urban and populous. Timber production is now not the only use we find for our forests as recent polls reflect. We all realize that Oregon's economic base must be broadened; Governor Atiyeh has established a commission to encourage industy to come to the state and tourism is now our third largest industry with additional funds going into advertising to attract even more travelers.

More business will come (Tektronix to build plant at Lebanon, an O&C county) and more tourists, and Oregon's beautiful, clean environment will be one of the strongest attractions. For Oregon's greatest economic stability, we must become a "Multiple Use" state instead of a timber-dependent one. Alternative IV will best serve this end.

Sincerely,

Cathie Olcott

(Mrs) Cathie Olcott

Response to comments in Letter 27.

27-1 The acreages listed for each alternative represent the equivalent of 100 percent losses of soil productivity. These estimates represent accumulated percentage losses expected to result from timber harvest and road construction throughout the SYUs during the next decade and reflect anticipated benefits from mitigation. The 590-acre difference between Alternative 1 (modified) and Alternative 4, for example, would be equivalent to a timber production loss of 21.4 MM bd. ft. for a 50-year harvest rotation, 30.5 MM bd. ft. for a 60-year rotation and 38.1 MM bd. ft. for a 70-year rotation (data from USDA Forest Service Bulletin 201, Table 3). See response to comment 18-7.

Soil productivity losses have been considered in planning and factored into allowable cut calculations.

27-2 The number of acres broadcast burned during the past decade is the same as that projected for the next decade under Alternative 7 (see Table 1-2). There is a sizable difference between alternatives in the number of acres that would be burned and the amount of smoke that would be added to the upper atmosphere. Whether additional smoke at high elevations under some alternatives would create problems is unknown. With regard to the new preferred alternative, slash burning would be reduced by about 40 acres per year compared to the past decade rate.

According to the 1980 Oregon Timber Assessment (OSDF 1980), the total harvest projected for the management units (North and Mid-Willamette timbersheds) encompassing the EIS area is 291 MM cu. ft./year for the 1980's. Assuming an identical harvest per acre for all ownerships, BLM's 14.64 MM cu. ft./year harvest under the new preferred alternative would represent approximately 5 percent of the acres scheduled for burning annually.

27-3 Several recent reports indicate that under certain circumstances, manual methods can be more effective than herbicides in controlling competing vegetation. The report by Jan M. Newton (1979) is an example. Research addressing alternatives to herbicide application will be discussed in a draft BLM vegetation management EIS which is in preparation and will soon be available for review.

27-4 Following final approval, the timber management plan will remain unchanged for approximately 10 years unless circumstances require modification. Modification might be required in response to a long-term depressed timber market, a national emergency requiring accelerated timber production, major changes in natural resource management policies or a major natural disaster (wind, fire).

28

SIERRA CLUB ...Oregon Chapter
2637 S.W. Water St. Portland, Oregon 97201

March 12, 1982

Mr. Joseph C. Dose
Salem District Manager
Attention EIS Team Leader
Bureau of Land Management
P.O.Box 3227
Salem, Oregon 97302

Dear Mr. Dose,

It is our understanding that comments submitted here on the Timber Management Plan for the Eastside Salem District Bureau of Land Management lands will be used not only in evaluating the Draft Environmental Impact Statement, but also in making the ultimate land use decisions for the area. Although we are concerned about the adequacy of this statement on a number of points, our primary concern is with the ultimate decision. Alternative 4, with modifications, is the only reasonable alternative.

28-1 The Draft E.I.S. fails to properly evaluate the potential for
slump-earth flows under the various alternatives. Also, the draft
statement is too general in its scope. For example, the impact
on fish, wildlife, and plant populations within the different
28-2 major drainages in the S.Y.U.'s should be delineated. Since B.L.M.
administered lands contain the last remaining substantial stands
of old growth timber in the western Cascade foothills, the impacts
upon wildlife, fish, and plant populations should be evaluated for
the entire area instead of for B.L.M. lands alone. For example,
a reduction of spotted owl populations to 50% of their current
level on B.L.M. lands would be even more significant if the current
population of owls on B.L.M. lands comprise 95% of the remaining
owls within the western Cascade foothill area. Fish populations
28-3 are projected to meet or exceed "recent historical averages" under
some of the alternatives. Does "recent" mean the last two, ten,
or one hundred years? This is deceptive without further definition.
In the Final Environmental Impact Statement we encourage B.L.M.
planners to correct these defects.

The Oregon Chapter of the Sierra Club supports a management plan similar to Alternative 4, with modifications. The other alternatives listed in the Draft E.I.S. are too oriented toward timber production at the expense of other resource values. The modifications to Alternative 4 are: 1) Herbicide use should be reduced to a minimum. Competing vegetation should be eliminated by biological, mechanical, and manual means whenever possible. 2) To protect woodpecker and other snag dependent species of wildlife

from severe population declines four snags (standing dead trees greater than 10 inches D.B.H. and not less than 30 feet tall) or four living trees of similar D.B.H. should be left per acre on harvested sites. 3) Whenever possible first order streams should be protected from warming by direct sunlight through the use of buffer strips.

This management plan would more adequately protect fish, wildlife, and plant habitats. The risk of adverse long term health effects from herbicide use would be minimized. Areas of Critical Environmental Concern would remain uncut and unroaded receiving the necessary protection from timber harvest they deserve. Outlined below are aspects of the plan that should be implemented in the final decision.

All seven areas listed in the Draft E.I.S. as potential Areas of Critical Environmental Concern have outstanding resource values meriting protection from timber harvest. Table Rock, a potential A.C.E.C., has also been proposed under a Recreation Land designation. This area should remain unroaded and with no timber harvest allowed. The proposed Table Rock-A.C.E.C./Recreation Land area holds scenic vistas, important and varied plant communities, a potential National Historic Trail, cultural sites, and a ten mile ridge trail system providing the best dispersed recreation opportunities in the district. Whatever designation is ultimately decided upon for the Table Rock - Rooster Rock - Old Table Rock Trail - New Table Rock Trail area, timber harvest should be excluded from the entire area. The six other A.C.E.C.'s all deserve similar protection. When harvesting timber units adjacent to A.C.E.C.'s great care should be taken to prevent blowdown of trees within the A.C.E.C.'s.

Old growth and snag dependent wildlife species need sufficient habitat to maintain stable and healthy populations throughout Eastside Salem B.L.M. District lands. The land distribution plan outlined in the E.I.S. for Alternative 4 would help insure that diverse habitats are available throughout the S.Y.U.'s. Our amendment requiring snags to be left in harvested timber units would help to insure that woodpecker populations would not seriously decline. Not only would these snags help preserve woodpeckers, they might also serve to aid reforestation efforts by providing perches for owls hunting mountain beavers. The O&C Act of 1934 was essentially a conservation act. Threatening old growth and snag dependent species with extinction was not intended in the above act and has not become official policy since.

Before pollution and dams killed most major fish runs on the Willamette River and its tributaries millions of salmon and steelhead used the streams draining B.L.M. managed lands in the E.I.S. area.

The Draft E.I.S. compared projected fish runs of the various alternatives with "recent historical averages" referring to runs during the past ten to fifteen years. Keeping stream sediment loads low and water temperatures cold are crucial to rebuilding fish populations in streams of this area. Stream structure is also influenced by forest debris falling into them. Buffer strips along all second order streams (and larger) and along most first order streams are needed to maintain fish habitats. This is necessary to maintain cold water temperatures since smaller streams feed the larger ones. Two hundred years from now the genetic resources present in these salmon and steelhead populations may be of far greater value than the trees now shading the waters of this area. The fish populations have in past years been so decimated it is very important to modify current management practices to maintain fish habitats.

Rare plants should also be protected from disturbance. The removal of potential A.C.E.C.'s, old growth wildlife habitat, riparian zones, and recreation lands from the areas available for timber harvest would enhance forest diversity. Ecosystems would be less simple and more stable. This is a desireable objective.

In addition to commenting on the management plan proposed by our Sierra Club Chapter, we submit our views on the proposed alternative. The amount of land set aside for timber harvest is too large. As outlined in the Draft E.I.S. a wide range of adverse environmental effects would occur. In depending upon clearcutting, slash burns, herbicides, and other intensive timber management activities to the extent forseen in the proposed alternative, Douglas Fir and Noble Fir dominated forest stands are favored. These monoculture forest stands are more susceptible to catastrophic insect, disease, and fungal attacks. Reducing the amount of land allocated to intensive timber management will create a more diverse and stable forest environment. 28-4

The Table Rock area would receive only partial protection under the proposed alternative. Buffer strips along the Old Table Rock and Rooster Rock-Pechuck trails would be so narrow that the first strong wind would blow most of these standing trees to the ground. 28-5 A road would cross the Table Rock trail which is a proposed National Historic Trail. The primary zone A.C.E.C. protection afforded the immediate Table Rock and Rooster Rock area would be adequate, but we doubt that the buffer zone of the A.C.E.C. would provide much protection. Roads would be closed by gates in the buffer zone, but it is doubtful that motor bikes could be excluded from roads in the area. A 10% per decade harvest cycle on the trees in the buffer zone would lessen impacts slightly compared with other intensively managed lands in the Eastside area. We believe that the Table

Rock area should remain unroaded with no timber harvest allowed.

Impacts of the proposed alternative on old growth and snag dependent wildlife species would be severe. Leaving corridors with old growth habitat available is better than the more timber oriented alternatives, but it is far from adequate. The old growth left on B.L.M. lands is crucial habitat for wildlife since old growth is rare on other lands in the western Cascade foothills. The proposed 28-6 alternative evades any management decision on maintaining habitat for woodpeckers and other snag dependent species.

Fish runs would also continue to suffer adverse impacts under the proposed alternative. Protecting only those second order streams with fish runs or which contribute to municipal water systems by providing buffer strips as outlined in the proposed alternative leaves a number of second order streams to be muddied and warmed by timber harvest and road building activities. Every second order stream eventually runs into a larger stream carrying fish runs. All second order and larger streams need buffer strips of uncut timber. Although the Draft E.I.S. projects improved stream conditions when compared with the existing situation this is deceptive. Poor management practices in the past have left severely impacted streams as the current situation. Small improvements are not sufficient.

In summary, it is our contention that the Eastside Salem B.L.M. District lands have other important resource values besides being a source of logs for the wood products industry. These lands are accessible to the population centers of the Willamette Valley. Spotted owls and pileated woodpeckers use the old growth timber remaining on these lands which serve as refuges for these species. We believe that Alternative 4 with our modifications will best provide for a mixture of land uses in the B.L.M. managed forests of this area.

Sincerely,

Kelly O'Brian Smith
for Mary Kyle McCurdy,
B.L.M. Coordinator for the Sierra Club

Response to comments in Letter 28.

28-1	The text has been revised in the FEIS, Chapter 3, Impacts on Soils, to include an evaluation of the potential for slump-earth flows.
28-2	There are two levels of environmental analysis in the Eastside Salem timber management program: an EIS for two combined sustained yield units and environmental assessments (EAs) for each timber sale. The EIS and EAs in combination address an adequate array of impacts for a variety of geographic units. Where data are available, regional impacts have been documented in the EIS (e.g., changes in economic conditions and vegetation age classes).
28-3	Recent historical averages were based upon data from the last 10 years.
28-4	Current forest inventories show that Douglas-fir is the dominant species on 87 percent of the BLM-administered forest land base. True firs, including noble fir, compose 3 percent. Dominant species on the remaining 10 percent include western hemlock, western redcedar and hardwoods. Approximately 30 percent of the conifer forest land base has been reforested. The objective of the reforestation program is to plant the most site-adaptable commercial species available. For the past few years, Douglas-fir has composed approximately 85 percent of the planting stock, noble fir 13 percent and western hemlock and western redcedar the remaining 2 percent. On replanted sites, competing vegetation is controlled until conifers are established as the dominant species. During this reforestation period, vegetation diversity is suppressed but not totally eliminated. Shrubs, hardwoods and other conifers regrow naturally in virtually all managed stands. These managed stands may be more susceptible to insect, disease or fungal attacks, but there is no evidence that losses would be significantly greater than in natural stands.
28-5	See Common Issue 3.
28-6	See response to comment 18-10.

30

Phone (503) 829-9131 Main Office
Phone (503) 829-2341 Sales Office
TWX 910-466-7021

EQUAL OPPORTUNITY EMPLOYER

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Mfg Specialty Items Green & Dry
P. O. BOX 419
MOLALLA, OREGON 97038

March 17, 1982

Salem District Manager
Attention EIS Team Leader
Bureau of Land Management
P.O. Box 3227
Salem, Oregon 97302

Dear Sir,

I would like to address some comments to you concerning the draft of the Eastside Environmental Impact Statement.

I have attended the public and industry meetings and also had numerous discussions with BLM personnel. The more I talk to people and the more I study the draft, I find myself becoming increasingly alarmed and concerned by your plans. My overall feeling towards your proposed alternative is negative. It seems that you have gone to a considerable amount of work to justify your alternative while throwing out the other seven alternatives.

My first concern is your blase' attitude towards the BLM budget. In this era of budgetary deficits and cutbacks, the BLM is assuming a 40% increase in the budget is forth coming. This would permit such intensive management practices as fertilization, precommercial thinning and genetic improvement. This is a very commendable goal but is it realistic to assume these practices will ever take place? 30-1 Past history has shown that when the budgetary axe falls, these are the first practices to be abolished. This, in turn, will prohibit you from growing trees at the ratio needed to sustain the allowable cut.

In table 1-1 the proposed alternative will manage 102,901 acres of land for intensive timber production, which means that 56,997 acres are to be managed for other amenities. In other words, 36% of the land base will not be managed for forest 30-2 and timber production. It astounds me that you would ignore this land in western Oregon, where trees and employment are synonomous. I feel you should minimize this acreage and maximize timber production on all lands. Certainly, there are non-forested and fragile sites that will never support trees or timber - these areas can and should be recognized as such. But you propose to set aside thousands of acres for "visual resource management", "wildlife habitat" and "areas of critical environmental concern". Nearly 19,000 acres are proposed for these catagories. I feel this is excessive. These lands should be returned to intensive timber management.

Your proposed plan sounds like a spotted owl management plan. Nearly every page has a reference to spotted owls. This species is recognized as threatened only by the State of Oregon. On page 2 - 16 you state "... the spotted owl may become a candidate of Federal listing". Based on that rationale, the deer may become scarce, the hummingbird may become threatened, the garter snake may become extinct. I should add one more species - the logger and mill worker may become extinct, also.

30-3 The Salem "allocation" for spotted owls is 12 pairs. I understand 10 pairs have already been located on the East Side of the district. I was flabbergasted to discover that all BLM lands are not even being searched for owls. In fact, only the old growth habitat is being inventoried for owls. Since you don't expect to find owls in second growth, you are not even lookingin second growth stands. You have artificially created an owl shortage by only looking where you choose. The oil at Prudhome Bay would never have been discovered if someone didn't want to look there for it. And yet, even though you are looking only in the old growth habitat on the Eastside, you have already found 83% of the entire district allocation of owls. This really makes me wonder just how threatened these birds are and how many more are lurking in the forests of Western Oregon.

I am totally against the proposed action as outlined in Appendix D. The very idea of managing a forest for 350 years is riduculous. The forest is a living, breathing, ever - changing entity. It cannot be preserved like a vase in a museum. The forest is assaulted continually by fire, disease, drought and wind. Trees die of old age and competition. Under this approach some of the most valuable wood left in Oregon will be managed to rot back into the ground. Who will be around for the next 350 years to insure the continuity of this management scheme?

This old growth is valuable, extremely valuable. Anyone who has ever purchased a piece of clear lumber or A grade plywood would know just how valuable this wood is. Old growth timber is already a scarce commodity and locking up 12,000 acres more only increases the scarcity of the commodity.

Wildlife species have adapted, changed and become extinct since time began. That process is irreversible. Preserving patches of old growth every mile or so in a 4 mile corridor is nothing but a futile effort made noble by the imagination of man. Vast tracts of timberland have already been designated as wilderness to be left untouched by axe and road. In these sanctuaries wildlife species will survive, adapt and become extinct as they have done for countless millions of years. The BLM scenario would lead me to believe that their 12,000 acres are the last of their kind in Oregon when, in fact, 1,200,000 acres are already preserved as wilderness. As lands are managed and cut, certain wildlife species will indeed become scarce, but not extinct. The wilderness acreage cited above does not even include the thousands of acres preserved as stream buffers, natural areas, parks and fragile sites. 30-4 Could you please explain to me what prohibits a spotted owl from living in the streamside buffer and visual resource zone along Quartzville Creek?

I am gravely concerned by your proposed management plan for the Table Rock ACEC. I understand that 5,400 acres of prime second growth Douglas Fir is directly affected by your plans. 30-5 Nearly 2,100 acres will be withdrawn and locked up for trails and scenic areas. The remaining 3,300 acres will contribute only 2.5 MMBF to the allowable cut each year. 30-6 Presented another way, approximately 165 million board feet (3,300 acres at 50MBF/acre) of timber will contribute only 2.5 million board feet. This represents only 2% of the total volume, less than the annual growth rate for this site. Based on a 100 year rotation, the annual cut could be as much as 16 million board feet from this area, or 6 times your proposed harvest level. I hope that you would reconsider this plan and increase the harvest level on these 3,300 acres.

I could go on, but my feelings are all negative to your proposed plan of action.

I strongly urge you to reconsider your plans and increase the allowable cut to a minimum of 110 MMBF per year. It can be done without undue harm to the environment. There must be a balance between timber supply and wildlife, between jobs and recreation, between revenues and aesthetics. But I feel your plan does not achieve this balance and is skewed towards the subjective qualities. When a mill worker is out of a job, his appreciation of spotted owls and scenic vistas become secondary to putting bread on the table.

Thank you.

Sincerely,

Micky Bellman

MICKEY BELLMAN
Forester

Avison Lumber Co.

Response to comments in Letter 30.

30-1 See Common Issue 1.

30-2 A breakdown of the 52,553 acres is provided in Table 1-3. These acres are summarized as follows:

Land Allocations	Acres
Non-forest Lands	11,695
Fragile Site Withdrawals	10,958
Reforestation Withdrawals	953
MFP Withdrawals	15,656
Hardwood Lands	5,035
Scattered Tracts	125
Constrained Timber Base	7,696
Stand Conversion	435
	52,553

Of the total, the constrained timber base and stand conversion acres will be managed for sustained timber production. An additional 1.1 MM bd. ft. could be harvested annually from the constrained acres if they were placed in the intensive timber base. The hardwood lands and scattered tracts are also available for harvest, although due to their small sizes and dispersed locations, harvest levels cannot be predicted in advance. The non-forest lands are physically unsuited for timber production, and the fragile and reforestation withdrawn lands cannot be harvested or intensively managed without significant site degradation. The actual amount of suitable land not managed for timber production would be 15,656 acres or 10 percent of the total SYU acreage.

30-3 Funding for wildlife surveys is very limited. Given this limitation, spotted owl inventory units were selected which centered on old-growth conifer stands. The original survey included 15,400 acres of second growth and 16,600 acres of old growth. Biologists censused owls from high vantage points, usually overlooking entire canyons which had a variety of seral stages, including second growth. Only 1 of the 34 owl locations identified was within second-growth habitat, and that single location is now unoccupied.

30-4 The spotted owl is an interior forest species. It reproduces, feeds and rests within a dense old-growth forest environment. The stream buffer and visual zone along Quartzville Creek is too narrow and exposed by existing roads to provide the seclusion owls need.

30-5 Of the approximately 5,400 acres in the potential Table Rock ACEC, about 1,600 acres are in a primary zone and are withdrawn from timber production to protect fragile sites and scenic and recreation values. The 1,600 acres consist of 300 acres of commercial conifer timber and 1,300 acres of fragile sites and non-forest land.

30-6 The buffer zone of the potential Table Rock ACEC encompasses 3,800 acres of which 3,300 acres are commercial conifer timber and 500 acres are withdrawn fragile sites, hardwoods and non-forest land. Under Alternative 8, the 3,300 acres in the buffer zone would be subject to timber management. A recent reinventory indicates that this base supports about 174.2 MM bd. ft. of conifer timber (52.8 M bd. ft./acre). This timber would be harvested under the following guidelines: (1) 10 percent removal per decade; and (2) harvest credit for future gains from intensive practices. The harvest level for the first decade would be 2.5 MM bd. ft. per year.

32

Weyerhaeuser Company

P.O. Box 275
Springfield, Oregon 97477
A/C 503 · 746-2511

March 18, 1982

Salem District Manager
Attention: EIS Team Leader
Bureau of Land Management
P.O. Box 3227
Salem, Oregon 97302

Dear Sir:

This letter is being written in response to the DEIS for the Eastside Salem District. Our comments will be made in the following order:

I. Management Prescriptions for Proposed Alternative (PA)
II. Harvest Levels
III. Timber Production Base
IV. Wildlife
V. Areas of Critical Environmental Concern
VI. Other

I. Management Prescriptions for Proposed Alternative (PA)

A. Harvesting
We support the preference of clearcutting and the youngest harvest age being 60 years old with recognition that higher site lands can be harvested earlier.

B. Site Preparation
Broadcast burning - primary method.
Herbicides used where appropriate.
Mechanical site preparation limited to slopes under 35%.
We support these practices and guidelines combined with an economic analysis to consider cases where herbicides would be more cost effective than boradcast burning.

C. Reforestation
Target 245-300 trees/acre.
5-7 year green-up period.
We support these guidelines combined with an indication of initial planting levels and an emphasis that seven years is a maximum green-up period.

D. We support other management activities including precommercial and commercial thinning and fertilizer applications when based on an economical analysis. We also support the BLM statement that your standards will at least meet state rules.

II. Harvest Levels

We support increasing the harvest level on BLM land insofar as an increased harvest can be maintained through intensive forest management techniques.

III. Timber Production Base

We do not support reducing the timber base. We feel that the acres for intensive management for timber production should be maintained at its present level. This could be achieved by using Alternative 1 less the acres of critical soils. The O&C Act, while promoting other forest uses, requires the BLM to manage its lands for "permanent forest production" as a primary responsibility.

IV. Wildlife

We do not support preserving old-growth timber on lands subject to a forest management mandate; it is inconsistent with forest management objectives. We recommend that you do some type of cost/benefit analysis on wildlife protection and consider more
32-1 scientific input than only the Oregon Endangered Species Task Force in terms of spotted owl management.

V. Areas of Critical Environmental Concern

32-2 We do not feel that the Middle Santiam Terrace is an area that needs to be preserved. This area is typical of the entire Middle Santiam River and other areas along large streams. There should be more scientific input to justify withdrawing this land from the intensive managed timber production base.

VI. Other Comments

A. Page 1-7: "All public lands would be managed in accordance with objectives to mitigate or in some cases, avoid impacts of management activities on scenic values."

32-3 We do not support this statement; it subjugates forest management activities to a visual quality criterion which is not consis-
32-4 tent with the mandate of the O&C Act which places primary emphasis on permanent forest production. We do not support

the plan for visual resource areas and areas of critical environmental concern to be managed utilizing one to three acre clearcuts or harvesting 10% of the timber per decade.
32-5 We refute the contention that reserving large blocks of old growth timber is necessary to promote visual quality. This can be achieved through other methods.

B. "The BLM will require a complete cultural resource inventory on all acres involved in ground-disturbing activities."

32-6 We do not support this statement. Federal law requires that a survey be done only in areas likely to contain a site and to cease activities when a site is discovered. To require surveys on all lands is a very expensive and ineffective means of preserving cultural resources. In any case, the cost of these surveys should be borne by the BLM and not its licensees or contractors.

C. Page 1-17: "the major issues involved in future timber management are fish and wildlife habitat modification and impacts on economic condition."

We disagree with the implication in this statement. Most forest management activities are compatible and beneficial to most wildlife species. The exceptions are an important issue but shouldn't be placed before economic and forest management considerations.

32-7 D. One major item completely omitted from the DEIS is an outline of budgets for each alternative and a cost/revenue analysis. Lacking this critical information, the DEIS is very difficult to evaluate. You should provide an investment analysis of all costs and revenues, present and future on a discountable basis, before deciding on a management alternative.

In summary, we support modifying Alternative 1 to exclude areas of critical soils that can't be managed. We feel that it is very important to maintain the acres for intensive management for timber production at or higher than the present level.

Sincerely,

Quincy M. Powers
Vice President
Willamette Region
Weyerhaeuser Company

QMP:kb

Response to comments in Letter 32.

32-1 Research on the spotted owl in Oregon has been conducted primarily by Dr. Eric Forsman of Oregon State University. The results of Forsman's research are incorporated in the spotted owl management recommendation of the Oregon Endangered Species Task Force.

32-2 The Middle Santiam River Terrace was designated a rare terrestrial cell by J. Franklin and T. Dyrness in 1969, 1970 and 1973 and in the Pacific NW Research Natural Area Needs Yellow Book, 1975. The cell designation was "moist, temperate, river terrace forest with Douglas-fir, western hemlock, western redcedar, and associated hardwoods." Scientists at Oregon State University point out the high consistency of old-growth western hemlock, which indicates a very old climax forest. Forests of this age on a river terrace are rare. Even though a logging road through the area has preempted research natural area designation, unique ecosystem values are still evident, and the area qualifies as an ACEC.

32-3 Visual resource management is planning, designing and implementing management activities on public lands in ways that will provide acceptable levels of visual impacts. Therefore, without an activity, there would be no need for visual resource management. Under the new preferred alternative, timber harvesting would take place at the rate of 93.3 MM bd. ft. per year with clearcuts accounting for approximately 80 percent of the harvest. VRM and the visual quality criteria exist so that this level of harvest can be achieved with impacts on scenic values mitigated as feasible, consistent with the timber harvest goal.

32-4 See Common Issue 5.

32-5 BLM does not contend that reserving large blocks of old-growth timber is necessary to promote visual quality. Large (and small) blocks of old-growth timber would be maintained for wildlife and other resource management purposes. As pointed out, visual quality can be promoted by other methods such as utilizing 1- to 3-acre clearcuts and harvesting 10 percent of an area's timber per decade.

32-6 BLM is required to identify all significant cultural resources within areas of potential environmental impact. One hundred percent of the ground surface need not be examined to satisfy this requirement, and, in fact, considerable judgment is exercised in determining the intensity with which project areas are surveyed. However, until enough areas have been inventoried to provide a statistically defensible base from which to predict the occurrence of cultural resources, areas subject to disturbance will continue to be surveyed. Costs of cultural resource surveys related to timber management are borne by the BLM.

32-7 An economic efficiency analysis is summarized in Appendix N.

40

Salem District Manager
Attention EIS Team Leader
Bureau of Land Management
P.O. Box 3227
Salem, Oregon 97302

Dear Sirs:

I would like to make some comments on the Eastside Salem Timber Management Environmental Impact Statement. It looks as if a lot of hard work has gone into the publication but it was worth the effort. You've done an excellent job of proposing alternatives that include the concerns of every public land user.

The Oregon Natural Heritage Plan, Oregon's state natural areas program, specifically identifies "cells" which when filled would represent the full spectrum of Oregon's natural ecosystems to be passed on to future generations. Currently, about 36% of these cells are filled by existing natural areas. Of the types not represented, many occur in high quality only on federal land. The active participation of one of Oregon's major landowners and managers, the BLM, is necessary for such an effort to succeed. It is important, as development projects arise, for the Bureau to survey project areas for occurrences of native ecosystems and determine and avoid if possible any negative impacts upon them.

Full designation and proper management of the ACEC's and other special management areas described under Alternative 4 would fill a number of cells and go a long ways towards fullfilling the mandate outlined by the passage of SB-44B by the 1979 legislature (The Oregon Natural Heritage Bill). ACEC's and RNA's are essential tools for multiple use management in acting as a gene pool for plants and animals and as a baseline from which data can can be gathered. A protective management policy for each established area is essential. This EIS has done a superb job of identifying seven of the highest quality natural areas in the Salem District and suggesting them for special management. 40-1 To allow commodity type useage on them such as timber harvest would not be compatible with the protection of this valuable resource.

Riparian and wildlife habitat conditions would also be enhanced under Alternative 4. Such improvemnts would create the greatest increase in income and employment related to fishing, hunting, and other recreation of any of the Alternatives. Restoration of degraded riparian areas is invaluable in assuring a cleaner and more plentiful water supply for the future.

Thank you for the opportunity to comment on this Eastside Salem EIS. We appreciate the immensity and importance of your task.

Sincerely yours,

Curt Soper

Curt Soper/Data Manager
Oregon Natural Heritage Data Base

Response to comments in Letter 40.

40-1 A fundamental principle underlying the ACEC concept is that such areas may provide for a range of multiple-use activities, including those involving development and commodity production, provided that the important environmental resources within the areas are not damaged or endangered. Caution zones were included in several potential ACECs as additional safeguards for areas containing critical resource values, but they were not intended for complete withdrawal from timber harvesting. Timber can be harvested in the caution zones in such a manner that critical resources in primary zones will be protected.

41

190 Shaff Road
Stayton, OR 97383
March 19, 1982

Salem District Manager
Attention EIS Team Leader
Bureau of Land Management
P.O. Box 3227
Salem, OR 97302

Subject: Eastside Salem Timber Management Draft
Environmental Impact Statement

Dear Sir:

I have reviewed the referenced DEIS and do not approve of your proposed action, but give my support to alternative #1, Maximum Timber Production.

41-1 It is difficult to understand and, I believe, very improbable that you will attain the projected 90.0MM bd. ft. annual harvest under the proposed action, when in fact you have reduced the intensive timber production base by 17,428 acres from the present base. In short you are projecting a higher annual harvest than at present while significantly lowering the timber land production base. Intensive timber management on these fewer acres is supposed to make up the additional projected volume. It is my opinion that your calculations are overly optimistic, and that you will not achieve your goal of 90.0MM bd. ft.

41-2 I am disappointed that the EIS fails to address the economic consequences for setting aside lands for such things as the Spotted Owl. The general public needs to be aware of how much 1,000 acres of old growth timber is worth, so they can make an intelligent decision on how many owls should be protected or if they need protection at all.

My greatest concern regarding BLM planning activities is what I see as a continual erosion of the timber producing land base. Planners are carving out large areas to seemingly please the desires of every special interest group. I believe in the multiple use concept and feel that we can have pure water, recreational opportunity, wildlife and scenic areas along with and on the same acres as timber production. Your planners need to keep the common good for the people of Oregon as the most important consideration in the planning process.

Sincerely,

Vince Brand

Response to comments in Letter 41.

41-1 See Common Issue 1.

41-2 See response to comment 25-1.

45

The Oregon Equestrian Trails
February 17, 1982

Salem District Manager
Bureau of Land Management
P.O. Box 3227
Salem, Oregon 97302

Re: Comments on the Eastside Salem District Timber Management Draft Environmental Impact Statement as requested.

Dear Sir:

The Oregon Equestrian Trails, a statewide association of horseback riders, wishes to take this opportunity to comment on the statement and the alternatives proposed therein.

1. We are impressed by the obvious amount of data collected and the thoroughness of the evaluation of the impacts.

45-1 2. We are distressed by the lack of consideration given to our chosen form of outdoor recreation--Trail Riding on horseback. We find only one mention of "Hiking/Horse Riding Trails" (Appendix J, part B).

3. We have confidence in the checks and balances within the system as it has been explained to us in separate meetings with Bureau of Land Management personnel.

4. We have had some difficulty assessing the differences between the proposed action and the alternatives, but we generally prefer alternative number 4 with the Proposed Action a strong second.

5. We would propose that the Bureau of Land Management take a stronger stand in the protection of trails suitable for general use by "Hikers", "Horsebackers", and others of the general public. That forest trails with general use be restored after management activities. That an effort be made to re-establish the old trails of historic significance. And last, that if the Bureau of Land Management does not have funds or manpower to maintain the existing trails across the lands it manages, then B.L.M. enter into cooperative agreements with user groups to maintain those trails.

This response was considered and prepared at my direction by a committee composed of a broad strata of our membership. Their decisions were those of horsemen, as well as concerned citizens, as such, they fairly represent the opinions of our total membership.

Sincerely,

Robert Gover, President
Oregon Equestrian Trails

P.S. Representing a membership of 300 individuals.

I have reviewed this report and approve it for the membership of the Oregon Horsemen's Association.

Gloria Shibley, President
Oregon Horsemen's Association

Response to comments in Letter 45.

45-1 Trail uses, including hiking, backpacking and horse riding, are collectively discussed under the subject of trails (see Index - Trails). Management recommendations for all trail uses are addressed in detail in the Eastside Salem Management Framework Plan which is available for review in the Salem District Office.

46

NWTA

NORTH WEST TIMBER ASSOCIATION

1355 OAK STREET • P.O. BOX 5554 • EUGENE, OREGON 97405
TELEPHONE (503) 686-9603

March 16, 1982

Mr. Joe Dose, District Manager
Bureau of Land Management
P. O. Box 3227
Salem, OR 97302

Dear Mr. Dose:

On behalf of North West Timber Association I am pleased to have the opportunity to comment on the Draft Timber Management EIS for the Eastside Salem Unit. Due to our extensive involvement in BLM planning, including the draft and final EIS's for the Westside Salem area, your office is aware of many of our concerns with the methods and procedures being used by the planners in the current efforts. Rather than repeating all of our concerns I will concentrate this input on the key issues related to a reasonable analysis and decision process for the Eastside Unit.

PROCEDURAL CHANGES

The decision of the Bureau to drop the "draft decision" stage from the planning process is a significant change. In the past the BLM has specifically requested that the public direct their comments on the draft to matters of "adequacy", whereas, we are now asked to also "address the prospective decisions." I do not object to this streamlining provided that in the final statement the preferred alternative will be changed, and further, provided certain changes in procedure are also made.

The final EIS will in essence become the draft decision document. Therefore, all the information which is scheduled to be in the draft decision documents on other units must be included in the final EIS. This should include the potential effects of budgetary constraints and an analysis of the economic efficiency of alternatives.

Your cover letter for the draft EIS indicates that a short form final EIS will be used for the Eastside Unit. This is totally unsatisfactory and a full document must be produced. The basic reasoning is related to the fact that a changed or new Preferred Alternative, representing the proposed decision, will be included as part of the final EIS and the public must be shown the full analysis of impacts from the new alternative. To attempt this in a short form final statement, which in affect would have to alter every tabular and written comparison of alternatives in the draft, would make such a confusing mess that not even the planners--let alone the public--would be able to understand what is happening.

46-1 Therefore, I would expect to see the final EIS as a complete document fully disclosing the impacts of all alternatives as well as printing all input and the BLM's responses. Since you have also solicited public preferences on potential decisions I would expect the final EIS to analyze the content of public input from both a preference, as well as, EIS adequacy point of view.

REASONABLE MAXIMUM TIMBER ALTERNATIVE NEEDED

Contrary to the recommendations made in the scoping process, the so-called maximum timber alternative (Alternative One) presents a land use scenerio which is unsatisfactory to timber interests. It is irresponsible (assuming the TPCC was correct) to include some 11,900 acres that were withdrawn in the TPCC process because they could not be managed for sustained yield. You, thus, present an alternative which both fails to comply with even a strict interpretation of the O & C Act and is contrary to the principles of sound forest management.

Unfortunately the jump between Alternative One and Alternative Two (which you erroneously call Emphasis on Timber) is so great that only one alternative (number One) complys with a key decision criteria, the Forestry Plan for Oregon.

46-2 Therefore, in the interest of presenting a reasonable range of viable alternatives as well as isolating what very well may be the best candidate for the proposed action, the final EIS should contain an alternative which would use the same land base as in Alternative One, except that the Fragile Site and Reforestation problem areas identified in the TPCC process would not be included in the intensive timber management base. Based on an interpretation of the data in the draft EIS such an alternative would:

1) provide 11,695 acres of non-timber and 12,800 acres of timberland to be available for use as recreation sites, natural and cultural areas, old-growth preserves, and other non-timber uses.

2) have an intensive timber management base of 130,000 acres which would produce (under the intensive management assumptions of the PA) a sustained yield annual harvest of approximately 110 MMBF, 19 MMBF more than the PA.

3) have a very favorable economic impact on the state and local communities in creating 700 new local job opportunities over the current harvest level and generating some $13.8 million per year for county governments--an increase of $3 million.

4) provide enough old-growth habitat to protect Northern Spotted Owls throughout the life of the plan and beyond.

5) meet or exceed the state policy in the Forestry Plan for Oregon while meeting or exceeding the regulations for environmental protection.

THE ECONOMIC FALLACY

On Page 3-1 of the Draft EIS the following statement is made: "A basic assumption of the analysis is that sufficient funding and personnel will be available for implementation of the final decision."

Continuing to ignore the economic realities of life by hiding behind such a gross assumption represents the greatest threat to the economic stability of local communities and industry dependent upon the BLM timber supply. This assumption is simply unsound for the proposed action and the levels of management intensity proposed in the plan.

46-3 For example, the proposed action would withdraw from production 25,000 acres (VRM, Riparian, ACECs, and old-growth wildlife habitat) of highly productive commercial timberland. Despite this attack on the land base the alternative proposes to actually increase the annual harvest level by several million board feet. What a nice picture this presents--everybody is happy because everyone gets more of everything. Unfortunately, when one takes off the rose-colored glasses he will see a very dark cloud on the horizon in the form of the budget assumptions. When one examines the numbers it becomes evident that to achieve the stated outputs will require increases in funding to the tune of 20-25 percent. One becomes more disturbed when it is realized that all the districts doing planning are going down the same path with blinders on. It appears that for western Oregon BLM lands the currently proposed actions will require a 40 percent increase in funding to maintain harvest levels. To assume that such increases will be available is totally absurd.

The realistic look at availability of funding for intensive management in the future must be considered in the decision process and laid out for public review in the final EIS. Indeed, for each alternative a range of funding levels should be examined and the harvest levels for each displayed. Such an analysis will no doubt show that within reasonably obtainable budget levels increases in harvest will be possible, but only if the commercial timberland base is maintained.

46-4 Once it is realized that there is a public concern with economic efficiency in government today then some measure of relative efficiency becomes important. An analysis by one industry group has shown that the benefit -- cost ratio of a modified maximum timber alternative (similar to that recommended in the second section of this letter) would be 3.0 compared to only 1.95 for the PA. Clearly, an alternative which has a higher B:C ratio will be better suited to utilize a scarce dollar resource than will one with a lower ratio.

DEPARTURES AND HARVEST AGE CONSTRAINTS

The application of some creative thinking in Alternative Five was appreciated and revealed that alternatives other than simply the traditional are certainly available. An approach which permits positive responses to short run problems while assuring an increase in harvest in perpetuity obviously has a great deal of appeal.

While this approach opened the door on some opportunity, further analysis is needed to fully disclose the possibilities to the public and the decision makers. Two recommendations for additional analysis:

46-5 1) An approach similar to Alternative Five should be made using a full timber management land base in order to show the full extent of the opportunity. Once the realities of the budget constraints are realized this alternative may become very important.

46-6 2) The effect of combining the inventories in the Clackamas-Molalla SYU with those of the Santiam SYU in the calculation process should be examined. Clearly, the harvest level could not drop from the sum of two as presented and some increases are possible. While such a plan might distort future harvest patterns in relationship to manufacturing facilities benefits of an increase in harvest could very well outweigh the problem.

THE OLD-GROWTH AND SPOTTED OWL ISSUES

The entire old-growth issue has been grossly over-emphasized and misrepresented in the EIS. The general tone of the document is that if these allocations are not made the old-growth will all be gone, along with it the spotted owls--all within the next decade. With 440,000 acres of old-growth in the planning area, of which only 27,300 acres are BLM controlled, it is clear that the Bureau's decision is hardly critical to the issue. Even more important is the situation with old-growth during the next decade, the life of the plan. Seeing a comparison is interesting:

	OLD GROWTH COMMERCIAL FORESTLAND ACRES (end of first decade)	DECREASE FROM EXISTING SITUATION
Proposed Action	20,800	6,500
Alternative One (maximum timber)	19,200	8,100
Alternative Four (non-timber)	22,700	4,600

46-7 The important fact to note from this data is that not only will significant acres of old-growth remain at the end of the decade, but the difference in old-growth habitat between maximizing timber and the preferred alternative is only 1,600 acres. The overall needs for old-growth have not even been defined and certainly a lot of knowledge needs to be gained concerning the management of species such as the spotted owl. The Pacific Northwest Range and Forest Experiment Station has just formed a research arm to deal with these questions and clearly much more data will be available in the next planning process. Since maximizing timber will not foreclose reasonable options for old-growth management for one, if not several, decades it is unnecessary to make the types of allocations proposed.

The problems with the handling of old-growth in the EIS were simply echoed and amplified in the discussion of the spotted owl. The level of knowledge does not exist for the precise analysis and predictions contained in the EIS analysis. It is very clear that by proper harvest scheduling the population of owls could be provided for during the next decade. The rate of old-growth utilization under even the maximum timber allocation is such that the owl habitat can be protected for one to several decades while management techniques can be developed.

46-8 We are not at a point of no return in regard to the spotted owl. While the issue must be resolved, we are not out of time. The Fish and Wildlife Status Review of the Northern Spotted Owl puts the problem in proper perspective when it states: "Although numbers have declined, there is still a substantial population of Spotted Owls distributed throughout (sic) a broad geographical area." In analyzing the habitat situation for the owl the January 1982 report identifies roughly 2.8 million acres of existing potentially suitable habitat in northern California, Oregon, and Washington on public lands. Quite simply, we are not at a point in time when public resources and public well-being need be sacrificed to the benefit of this species.

46-9 Table 3-9 (Page 3-24) needs to be corrected in the final EIS to demonstrate the number of owl habitats that can be protected through the first decade by harvest scheduling. Since there is only 1,600 acres difference in old-growth retention between the PA and Alternative One in the first decade the prediction that 10 owls will be lost is clearly absurd. The ability of the wildlife manager to use land withdrawn from the intensive management base should also be included in the analysis.

46-10 Furthermore, the comparison between the 1981 inventory and the sum of all previous inventories is a gross misrepresentation based on my discussion with the staff at the March 2 meeting. The comparison presented does not account for such things as: the 1981 inventory checked locations where owls were found before and did not check suitable habitat that may not have produced a response in earlier inventories; the change in numbers did not address the fact that responding owls may have not been in their home range, but may have been foraging; and the comparison does not indeed document that the total population of owls in the Eastside area really changed at all.

IMPACT COMPARISONS

46-11 The tables on Pages B-3 and B-4 dealing with land allocations and harvest trade-offs were a welcome addition to the EIS although the information belongs in the text and not an appendix. Also, in order that the public understand the cost of the tradeoffs the effects in terms of jobs, incomes, and public revenues should be displayed. Such an analysis would appear thus: (Based On Factors Used In EIS).

ANALYSIS OF COMMERCIAL FOREST LAND ALLOCATIONS
AND BENEFITS FORGONE IN PREFERRED ALTERNATIVE

LAND USE CATEGORY	LAND CONSTRAINED OR NO HARVEST (Acres)	ANNUAL HARVEST (MMBF)	LOCAL JOBS (#)	PERSONAL INCOME ($)	O&C COUNTY INCOME ($)
VRM	4,527	1.9	57	767.9	240.3
Recreation Sites	1,454	1.7	51	687.1	215.2
ACECs	3,585	.6	18	242.5	75.9
Old-Growth Wildlife Areas	11,763	8.4	253	3,408.6	1,062.7
Riparian Zones	5,520	6.2	187	2,519.4	784.4
Miscellaneous (Cultural, Natural, etc.)	947	.9	27	363.8	113.8
TOTALS	27,796	19.7	593	7,989.3	2,492.3

CRITERIA FOR A PROPOSED DECISION

The most important element of the final EIS will be the revised Preferred Alternative which will represent the proposed or planned decision for the unit. In developing this decision we recommend the following criteria be used:

1) Maximize the intensive timber management land base which encompasses the traditional interpretation of the O&C Act.

2) Provide the most economically efficient level of management intensity within projected budget levels.

3) Provide for meeting old-growth habitat objectives through harvest scheduling rather than land designation for the first decade or the anticipated life of the plan.

4) Fully utilize withdrawn lands and mitigating measures to meet demands for non-timber outputs while meeting or exceeding requirements for environmental protection.

5) Utilize opportunities for departures from even-flow and harvest age constraints in order to maximize contribution to local community stability, job opportunities, and county revenues.

6) Be consistent with all three basic objectives of the Forestry Program for Oregon.

I hope that these comments will be helpful to you. We look forward to continued participation in your planning process.

Sincerely yours,

Dennis Hayward

Dennis Hayward
Field Forester

bjm

cc: Bob Burford, National Director
Bill Leavell, State Director

Response to comments in Letter 46.

46-1 Only letters with substantive comments on the adequacy of the EIS are printed in the final EIS. The record of decision will address public preferences.

46-2 Alternative 1 has been redefined to exclude TPCC withdrawn lands from the timber production base and to include a departure from even flow. See Chapter 1, Alternatives section.

46-3 See Common Issue 1.

46-4 An economic efficiency analysis is included in this final EIS as Appendix N.

46-5 See response to comment 46-2.

46-6 BLM did not make such allowable cut calculations for the Eastside SYUs. Past experience with such calculations indicates the allowable cut would not increase.

46-7 See Common Issue 2.

46-8 Within the same paragraph as the sentence quoted, the Fish and Wildlife report states, "If current trends in old-growth timber harvest continue, the Northern Spotted Owl could become endangered in a relatively short time." On the following page, the report states, "Therefore, all habitat modifications should be undertaken cautiously, with attention given to preserving as many management options as possible."

46-9 See Common Issue 2 and revision in text, Chapter 3, Impacts on Animals, Threatened and Endangered Animals section.

Since the 10 spotted owl locations may not be viable after one decade under Alternative 1, no protected locations are indicated in Table 3-9. Although some viable spotted owl locations could possibly be maintained by harvest scheduling in the first decade, optimum spotted owl habitat may be eliminated from the EIS area by the fifth decade under Alternative 1 (see Table 1-5).

Allocation of spotted owl management areas to TPCC withdrawn lands would not provide suitable habitat, because most TPCC withdrawn lands do not support old growth at present, and because most of the areas are too small to support stable owl populations.

46-10 Home ranges include nesting and foraging habitat. The 1981 inventory was conducted throughout known home ranges. If the home ranges were unoccupied in 1981, the owls are probably no longer living.

The 1981 inventory represents a sample of how owl populations are doing in known habitat areas. In unsurveyed areas, no attempt has been made to protect old growth for owl habitat.

46-11 The suggested table is presented as Appendix O.

48

Robert L. McNitt
40823 Huntley Rd.
Stayton, Oregon 97383

March 19, 1982

Salem District Manager
Attention EIS Team Leader
Bureau of Land Management
P.O. Box 3227
Salem, Oregon 97302

Dear Mr. Dose,

I would like to comment on the East Salem Draft Timber Management Environmental Impact Statement (EIS).

As a resident and a professionally trained forester employed in East Linn County I am familiar with most of the Bureau of Land Management lands included in the East Salem EIS. I have worked with Bureau of Land Management personnel in this area for nearly twenty years.

I support intensive commodity production i.e., "Fiber for People" as the primary use of all forest land. I recommend that your final management decision be tailored after Alternative #1-the Intensive Forest Management alternative -with creative and practical mitigating measures to maintain water quality, to provide artificial wildlife habitat and to develop flexible recreational opportunities. This approach will address the mandates of the 1937 O & C Act., the 1976 Federal Land Policy and Management Act. (FLPMA), the goals of the Forestry Plan for Oregon, and meet or exceed the requirements of the Oregon Forest Practices Act.

I would like to specifically address the issue of excessive old growth forest withdrawls for wildlife habitat. The issues of allowable cut calculations, economics, tax receipts, forest management techniques, etc. will undoubtly be covered by others.

Preservation of old growth forests seems to be the goal of the Salem District specialists. Their logic often seems narrow-minded, inconsistent and impractical. While studying the EIS and when discussing it with the specialists I was struck with their apparent inability or unwillingness to consider creative approaches to minimizing impacts of other forest uses on their specific disipline. As a general rule they are well meaning but idealistic, and often lack reliable time proven data and experience.

Stream protection for water resource and fish habitat is a prime example. During the early 70's the Salem District fish specialist developed standards for stream protection. These standards required extensive clean-out of all debris in streams including hand picking of small material. The standards even applied to intermittent streams that were often undefinable in the summer.

48-1 In the current plan the specialists recommendation promotes old growth buffer strips for the expressed purpose of providing future blowdown as a source of instream woody structure. In fact the Intensive Management Alternative proposed in the Eastside plan is critized for potentially eliminating the woody structure which would degrade fish habitat. These recommendations are unrealistic and will have little more practical longevity than those of a decade ago.

The credibility of the Northern Spotted Owl issue is similar to stream management. In the early 1970's the Northern Spotted Owl was alledged to be near extinction when a pair was discovered in the Corvallis watershed. The need for protecting these rare owls was the subject of intense discussion. From this debate the notions developed that the Northern Spotted Owl was a creature of old growth forests and that to survive old growth habitat was essential. Old growth stands provided a home for flying squirrels, an important part of the owls' diet, and a place for owls to swoop and get-a-way from natural predators.

After the Corvallis watershed affair owls were found throughout the region. When owls appeared in second growth stands the specialists' response was that the owls could exist in second growth stands but preferred old growth habitat 48-2 and needed the large old growth trees for nesting sites. Maps indicating identified pairs of owls in areas of old growth are presented as absolute proof the Northern Spotted Owl needs old growth habitat to survive. However, under questioning the specialists admit that their owl searching efforts are usually conducted in areas of old growth considered as prime habitat. Second growth, low elevation mixed hardwood-conifer stands and populated areas have not been seriously surveyed. The increase in known owl pairs from almost none to many during the last 10 years makes it difficult to support a long range Forest Management plan based on the alledged endangered species status of the Northern Spotted Owl.

The elk management recommendations in the draft EIS are an example of subjective population goals and habitat requirements. I have personal knowledge of the elk herd development in the Thomas Creek and Crabtree Creek drainages. Historically very small numbers of elk existed in the North Santiam drainage. The game commission made several elk releases in this area during the early 1960's. These introduced elk have done well in the Thomas Creek area which has been heavily clear-cut. Elk populations have increased in this drainage to levels where general elk hunting seasons have been allowed.

In 1981-82 a special hunt was necessary in the Jordan area south of Thomas Creek to control elk damage to farmers' property. The specialists recommend 48-3 increased elk populations in the Eastside Plan. Table 1-5 indicates that the Intensive Forest Management Alternative #1 will severely damage elk habitat. The specialists reasoning for this is that elk need the thermal cover provided by old growth stands. This assessment is based on a study from the Coos Bay area. It has been my understanding that dense stands of second growth provide adequate thermal cover. The Tillamook Burn is an example of elk thriving in an area with little or no old growth thermal cover. Again, we have a subjective need for old growth retention that is based on idealistic criteria for which there may be another adequate or possibly better alernative.

I do not want to appear completely negative but feel that these true life observations (and there are more) are necessary to point out a potential weakness that seems to be inherent in recommendations made by specialists with a single discipline point of view.

I appreciate this opportunity to articulate my concerns regarding the Salem District's old growth retention philosophy and the resulting excessive old growth retention in the Eastside Plan. I encourage you to thoughtfully consider my comments and examples when developing a commodity use oriented alternative.

If you have any questions or need additional information please do not hesitate to call.

Respectfully

Robert McNitt

Robert L. McNitt
40823 Huntley Rd.
Stayton, Oregon 97383

Response to comments in Letter 48.

48-1 The new preferred alternative includes provisions to withdraw some stream buffers from intensive timber production. However, it also proposes some timber removal to meet fish, wildlife, water quality and recreational objectives.

48-2 See response to comment 30-3.

48-3 Based on available data, elk populations will apparently benefit greatly from old growth. An Oregon Department of Fish and Wildlife report indicates that elk have "a definite requirement for old-growth timber during times of heavy snow cover." Snow depth is less under old-growth timber, and fallen branches, leaves, mosses and lichens provide food that is not available on cutover areas because of snow cover. By contrast, second-growth timber is relatively barren of forage during winter, because it supports only impoverished moss and lichen communities, and because dense canopies restrict browse availability. Old growth is more important to elk during the summer than in the winter, because elk have a low tolerance for heat stress, and because heat stress occurs more regularly than stress caused by occasional, severe winter storms. Multi-layered old-growth stands provide both thermal cover and forage areas, so elk need not leave old growth during summer heat. The Coos Bay study indicates a strong correlation between the amount of old growth and its use by elk. Therefore, the less old growth there is, the more important it becomes.

John Timm 50
473 E. Vine
Lebanon, Or. 97355
March 22, 1982

Salem District Manager
Bureau of Land Management
P.O. Box 3227
Salem, Or. 97302

Attention: E.I.S. Team Leader

I have studied the BLM Draft Eastside Timber Management E.I.S.

It is apparent that the specialists rather than forest timber managers have prevailed in preparation of the draft and are building empires in the organization. This is evidenced by the E.I.S. as well as the BLMs Western Oregon District Organization which provides District specialists and assistant specialists as well as one or more for each District Area.

I favor Alternate 1, maximum timber in spite of the fact that, as indicated by the last paragraph explaining this alternative, I will be in favor of destroying wetlands, riparian zones, old growth and mature timber, scenic areas and most non-commodity resource values. Forests are a renewable resource and in managing them all the above values can be maintained and need not be destroyed as implied. Forest

Draft E.I.S. page 2

management that maintains the forest provides other values as well as timber production.

50-1 Alternative 1 maximizes the benefits in employment, and revenues to public agencies, to an even greater degree than shown in the E.I.S. if the multipliers in the 1979 paper by the Oregon State Forestry Department, "Estimating the Economic Consequences of Commercial Forest Land Loss to Alternative Use", are used.

These benefits and revenues are important to Oregon and the Nation.

John Timm

Response to comments in Letter 50.

50-1 The employment and income multipliers used are based on the economic structure of counties in the EIS area. These will be different (and lower) than those for the State economy. The EIS addresses impacts to the local economy. If a multiplier based upon a broader area were used, the relative differences among alternatives would be the same.

57

The Nature Conservancy

1234 Northwest 25th Avenue
Portland Oregon 97210
503 228-9561

March 19, 1982

Salem District Manager
Attention: EIS Team Leader
Bureau of Land Management
P.O. Box 3227
Salem, OR 97302

Dear Sirs:

We at the Oregon Field Office of the Nature Conservancy have reviewed the Eastside Salem Timber Management EIS and would like to comment specifically on one Area of Critical Environmental Concern proposed in the plan.

The Sandy River Gorge ACEC, proposed for full protection under alternatives 2 through 7, is contiguous with Nature Conservancy ownership in the Gorge at several locations, and is also part of the Oregon State Scenic Waterway System. As part of the Sandy River Gorge between Oxbow and Dodge Parks, this Bureau land represents a part of our last opportunity to fully protect a low-elevation stream segment in the foothills of the Cascades. The BLM unit that is adjacent to the Sandy River also has the distinction of being the best-known low-elevation, old-growth representative of Douglas Fir in the Cascade Province. It goes without saying that this representation is of highest concern as a remnant of a once-widespread community type. It must be protected for genetic and silvicultural reasons as well as the more obvious recreational and aesthetic attributes it has. This site lends itself well to this type of protection, because it is already part of a de facto preserve system and is also an integral portion of the Sandy River Scenic Waterway. Additionally, access to this site would be difficult through the deep, unroaded Gorge.

57-1 Our next step in protection of this important unit should be to propose it as a Research Natural Area as well as an ACEC. As such, it would serve as a reference point for low-elevation Douglas fir, as a scientific research area, and as part of a national program designed to protect specific examples of community types throughout the Pacific Northwest.

I believe that you have a great deal of our information on the Sandy River Gorge. I would be happy to supply you with any more that you need. This spring, in fact, we are going to conduct a more rigorous search for low-elevation Douglas fir occurrences in the Cascades. I will send you the results of our work.

Western Regional Office
425 Bush Street
San Francisco California 94108
415 989-3056

National Office
1800 North Kent Street
Arlington Virginia 22209
703 841-5300

Salem District Manager
Attention: EIS Team Leader

I commend your efforts in protecting this most important site and look forward to talking with you soon.

Sincerely,

John Hoffnagle
Oregon Land Steward

JH:sm

Response to comments in Letter 57.

57-1 Under the new preferred alternative, the Sandy River Gorge parcels would be protected as an ACEC and Outstanding Natural Area (ONA). ONA designation is considered more appropriate for the area than RNA designation in light of current and projected estimates of recreation use. The area could still be used for research and education, although it would not be set aside exclusively for that purpose.

87

909 West Nevada
Urbana, Illinois 61801
March 12, 1982

Salem District Manager
Attention EIS Team Leader
Bureau of Land Management
P. O. Box 3227
Salem, Oregon 97302

Dear Sir:

This letter contains my comments on the Draft Environmental Impact Statement for the Eastside Salem Timber Management Plan. I am grateful for the opportunity to review the statement and I hope that my comments will be of some help to you as you make your decision. My comments are limited to three of the major issues involved in the project plan. These are the protection of wetlands, the protection of the habitat and population of the threatened Northern Spotted Owl, and the concern over the use of herbicides for forest management techniques. Although these interact somewhat, I deal with them separately here.

Wetland protection. Although the BLM's third major policy objective is to protect wetlands, the report provides only a cursory treatment of the description of existing conditions and possible impacts. Apparently, impacts on wetlands were not used to evaluate the alternatives since none of the decision criteria listed in the purpose and need section even mention wetlands. The policy objective cannot possibly be met using such a limited knowledge of possible impacts on wetlands. A light treatment of the subject might be allowable if the impacts on wetlands had been shown not to be significant. No statement is made of such a finding, but the cursory treatment implies, possibly falsely, that such is the case. Therefore, there is a need to reassess and state clearly and concisely the impacts of the alternatives on wetlands.

87-1 More specifically, in chapter 2 on affected environment, the report merely describes wetlands, the types of areas considered to be wetlands, and the types of vegetation found there. It fails to state whether any wetlands exist in the area, where they might be located, whether they are currently being affected, whether the amount of wetlands is decreasing, increasing, or remaining stable in the area, or how significant wetlands are as wildlife habitat in the area.

It seems unlikely that the amount of wetlands in the area is insignificant since 87% of the vertebrate species in the area use wetlands as optimal or marginal habitat. Thus, a significant impact on wetlands would have an equally significant impact on vertebrate fauna of the area. This is another reason for the need of a more detailed analysis including indirect as wellas direct impacts to wetlands.

In chapter 3, environmental consequences, some impacts on wetlands are briefly discussed but the report fails to discuss the extent of the impacts from timber harvest adjacent to rivers, road construction on wetlands, increased sedimentation, increased water temperature, reduced water availability, and similar conditions. However, there is not even an attempt to qualify or quantify these impacts. The statement fails to discuss the extent of any of the impacts discussed. Therefore, the reader cannot determine whether these impacts will be severe, moderate, or insignificant, and the report makes no statement to clarify this dilemma.

The statement needs to deal with the above questions and the impacts on wetlands in general with a more detailed and quantified analysis. Since wetlands are clearly a significant part of the wildlife habitat of the area, the imapcts on them should be included in the summary table (1-5). As the statement stands, the BLM has not met its policy objective of protecting wetlands. Before a final decision is made, the impacts to wetlands of each alternative should be assessed.

Northern Spotted Owl. Another of the BLM's policy objectives is to provide protection for threatened, rare, and endangered species. In stating the expected impacts to the northern spotted owl, the report does not identify the conditions that would allow for successful preservation of the owl, and it dismisses the potential loss as unimportant in light of other available habitat. It seems obvious from the statement that BLM plans to provide at least partial protection for the owl, but without a proper identification of its habitat needs, it seems unlikely that an accurate estimation of the amount of protection can be obtained.

It is apparent from the report that even the maximum amount of protection afforded by any of the alternatives would result in a loss of 2/3's of even marginally habitable areas in the first decade. Given the more stringent, and possibly more accurate, 1,000 acre criteria, the loss becomes 93%. It is important to note that these may be minimal loss figures since it is not apparent from the discussion whether effects of road construction, snag removel, and wetland and riparian growth damage were used as part of the determination of supportive habitat loss. The report fails to analyse secondary impacts on the habitat of the owl.

The report's conclusions concerning the expected impact state that there will be a significant impact on the habitat of the owls in the area and implies that this impact is insignificant because of the existence of other available habitat on BLM lands in the state. However, this is based on the assumption that the other areas will not take the same stance. Because there is only a weak indication that the other areas would assume the responsibility of protecting the owl's habitat (as is indicated by the fact that only one cooperative agreement has been reached), this does not seem to be a valid assumption. The result is that the cumulative impact is more severe than stated or implied.

87-2 Concluding, I feel that the report inaccurately states the impact on the habitat and population of the Northern Spotted Owl. The impacts of the preferred alternative and all the alternatives will be more severe than implied. There is a need to reassess the impact on the owl possibly in the form of further study in order to more clearly determine existing habitat requirements and conditions. Specific suggestions for mitigating measures should also be studied and included in the statement.

With the present analysis, it cannot be determined whether any of the alternatives fall within the objectives set forth in the purpose and need section to protect threatened species. Since the BLM is given discretion as to what is adequate protection, it must state accurately the degree of protection it is affording the owl.

87-3 Use of Herbicides. The use of herbicides in stand preparation, conversion of brushland and hardwood areas, and site release practices is a significant issue in most of Western Oregon. Although I realize that assessment of such impacts may be difficult to determine, the statement seems to lack as rigorous a study as is warranted by such a controversial issue. The report inadequately addresses this issue in several ways. Although concerns about herbicides have been expressed by several municipal water districts, the report concludes that impacts to water quality will be insignificant without first determining existing levels of herbicides in the water supply or expectedlevels after implementation of each alternative. It bases the conclusions on expectations of the effectiveness of design elements. This seems to be a probable case analysis. Unless the BLM can show that it is not just probable, a worst case analysis should also be submitted.

Significantly, the report fails to discuss the possibility of herbicides reaching streams simply by the process of surface runoff. The high rainfall of the area and the lack of vegetation resulting from management clearcutting practices and decreased evapotranspiration rates would produce large amounts of runoff that might carry significant amounts of herbicides into streams and other water bodies. There, possible impacts on aquatic fauna, non-target plant species, and human health might occur and be severe. The statement needs to address this possibility.

The concern expressed by the water districts suggests that there has been, in the past, and probably will be in the future (given increased use of herbicides), a significant contamination of the water by the proposed use of herbicides in the plan. The statement needs to show otherwise if it is to properly address the herbicide/water quality issue. Because of its lack of baseline data and its failure to deal with possible runoff problems, the draft statement has not shown this.

A second area, air quality with regard to herbicide use, has not been addressed by the report at all. Impacts of aerial spraying need to be assessed. Also, impacts on air quality (not just human health) from the combined practices of herbicide application and slash burning should be discussed since toxins would be produced by the burning of herbicides and released into the air. If impacts on air quality are expected to be insignificant, this should be stated and justified.

The statement fails to deal with several secondary and indirect impacts on other areas. These include impacts on non-target species, the food chain/web cumulative toxicity effects, impacts on natural community stability, indirect impacts on fauna via habitat destruction, indirect impacts on human health including aesthetic/psychological impacts (ie. fears of the presence of toxic herbicides and possible health effects), and impacts of diesel oil or other carriers on various of the above areas as well as water and air quality. Failure to discuss these impacts results in inaccurate findings as to significance of overall impact. Therefore, the final statement should address these impacts as well.

87-4 Interestingly, although the BLM admits that some adverse impacts will occur from the use of herbicides, the proposed action and all the alternatives except six and no action actually call for increased usage of herbicides. This seems to be in response to the BLM's statements in the purpose and need section that the purpose of the plan is to increase timber production and employment rather than simply maintain it consistent with its policy statement. The result has been

87-4 plans to increase timber production and employment in all alternatives except the extreme cases of alternatives four and six. Notice that alternative six comes closest to maintaining timber production and employment levels. The objectives are questionable in light of the basic policies set forth in the appendix that timber production be maximized consistent with environmental feasibility, and that local economic stability be maintained.

One final note: the use of herbicides is dealt with by the alternatives as an all or nothing proposition. Although mitigation measures will be taken, it seems that a decreased overall use might still meet timber production objectives and yet further minimize impacts from herbicide use. By using only the extreme no herbicides case, the statement effectively eliminates the possibility for 87-5 compromise and therefore possibly eliminates the possibility of partially decreasing use which may be the alternative most likely to simultaneously minimize impacts and maximize timber production. Therefore, I suggest that an alternative similar to the proposed action, but using only a portion of the berbicides, be analysed as to impact. (Note: this alternative should also be adjusted to deal with the wetland and owl protection issues.)

In summary, the report has not convinced me that there will not be significant adverse impacts from using herbicides or that the the use of them at the proposed levels is absolutely necessary to meet the BLM's policy objectives. There seem to be too many grey areas regarding the direct and indirect impacts of herbicide use on water and air quality, human health, natural community stability and species diversity, and the other areas mentioned above, to allow an implication of no significant impact on the environment and especially human health, without further discussion and support. Since a treatment of such areas is the explicit purpose of this report, unless the statement can clear up these grey areas, the use of herbicides should come under close scrutiny by the BLM.

Once again, I hope these comments will be of some help to you. If possible, I would like to obtain a copy of the Final Statement when it is published. Thank you very much for your time and attention.

Sincerely,

Kenneth C. Stapleton

Response to comments in Letter 87.

87-1 The text has been revised in the FEIS, Chapter 1, Alternatives section and Chapters 2 and 3, Vegetation, Wetland and Aquatic Vegetation sections. These revisions provide more information on wetland values and protection measures.

87-2 See response to comment 18-13. The text has been revised in the FEIS, Chapter 3, Animals, Conclusion section to include information on cumulative impacts on the northern spotted owl.

With regard to the Salem District assessment, impacts on spotted owls under the various alternatives were predicted by biologists using knowledge gained from field observations, maps, aerial photographs and estimates of old-growth availability in the future. Table 3-9 is a summary of the biologists' predictions. Details of the assessment are available for public review in the Salem District Office.

BLM agrees that additional studies are necessary. A special need is to design workable spotted owl habitat management plans.

87-3 Impacts of herbicide use are described in detail in a 1978 EIS prepared by BLM titled Vegetation Management with Herbicides - Western Oregon. Site-specific impacts are described in annual environmental analyses. A draft EIS containing new information on management of competing vegetation is being prepared and will soon be available for review.

87-4 No statements regarding the "... purpose of the plan..." are in the Purpose and Need section. The statements on pages 1-2 and 1-3 of the draft EIS are criteria used to evaluate alternatives, not plan objectives per se.

The policy statement has been changed to read "contribute to" rather than "maintain" economic stability (see Appendix A). This provides more flexibility for analyzing and considering alternatives with varying levels of contribution, including those which may not maintain community stability.

87-5 The degrees of herbicide use analyzed in this EIS were defined through a public scoping process. No suggestions for alternatives with incremental adjustments in herbicide use were received during scoping. In contrast, the Western Oregon Vegetation Management EIS now in preparation will address alternatives with varying degrees of herbicide use.

95

WESTERN FOREST INDUSTRIES ASSOCIATION
1500 S. W. TAYLOR STREET · PORTLAND, OREGON 97205
TELEPHONE
503-224-5455

March 23, 1982

Mr. Joseph Dose
District Manager
Bureau of Land Management
P.O. Box 3227
Salem, Oregon 97302

Re: Eastside Salem Draft Timber Management Environmental Impact Statement

Dear Mr. Dose:

Western Forest Industries Association (WFIA) appreciates the opportunity to participate in the timber management planning process on the Eastside Salem District. WFIA is a trade association comprised of roughly 100 manufacturers of lumber and plywood that have mill facilities in several western states. All our members are extremely dependent on the public forest lands for a source of raw material. Consequently, we are deeply concerned with timber management plans now under preparation on several western Oregon BLM Districts. WFIA and its members have attempted to participate in the Bureau's planning activities in a constructive manner. We have been active in public meetings, have met personally with Bureau staff on several occasions to discuss specific issues and have expressed our ideas and concerns in writing at every opportunity. We have been less than satisfied with the BLM's response to industry concerns. As each district publishes Draft Environmental Statements, our concerns seem to intensify rather than be relieved. In short, none of the districts to date, have taken advantage of the industry input developed in response to proposals made by other districts. We are pleased, however, with a procedural change initiated on the Salem District. Streamlining the decisionmaking process by eliminating the "Draft Decision Document" step is desirable provided, of course, that the preferred alternative in the Final EIS is truly responsive to public input generated by the Draft EIS. This will necessitate a complete comprehensive Final Environmental Statement including a new preferred alternative and documentation of how it responds to public concerns. The so-called "short-form" EIS referred to in the Draft Statement and used on the Westside Salem Plan will not be

sufficient to perform this function.

Our specific concerns regarding the Eastside Plan are not unlike those we expressed concerning the Westside Plan. We believe the future timber production potential of the district and the economic stability of local communities will be jeopardized by the unrealistic land base/intensive management tradeoff assumptions proposed in the preferred alternative. The range of alternatives is skewed toward the preservation of old-growth timber stands and does not fairly assess the production capability of the district. Impacts of the various alternatives on wildlife populations and habitat are presented in a distorted manner and tend to mislead the reader as to exactly how this decadal plan will affect wildlife. These concerns and our recommendation for a proper alternative will be addressed individually.

LAND BASE/INTENSIVE MANAGEMENT TRADEOFFS

One no longer needs to hire a soothsayer or a psychic to predict the content of preferred timber management alternatives on the BLM's western Oregon Districts. With the exception of the Roseburg District, every other planning unit has proposed very minor changes in timber production accompanied by tremendous reductions and withdrawals from the intensive timber management base. Even on the Roseburg District, while timber harvests are projected to increase by 34 million board feet, over 50,000 acres have been proposed for old-growth preservation. The Bureau's strategy in consistently pursuing this scenario is obvious. Pacify the multitude of Oregonians that depend on timber production for their livelihood while catering to those whose goal is to remove as much commercial forest land from production as possible. While the compromise appears to satisfy all parties, it is unfortunately based on the precarious assumption that large increases in funding for intensive forestry will be available to implement the plan. Yet, payments to the O & C Counties this year are 60 percent short of last year's revenue. The BLM's income will be reduced by a similar amount. Based on the limited cost data presented in the EIS, however, an increase in funding of approximately 25 95-1 percent will be necessary just to perform the proposed cultural practices under the preferred alternative. WFIA fully supports federal efforts to intensify forest management practices on public lands. But in the case of the Salem Eastside Unit, we do not believe the promise being made by district planners can ever be delivered in these economic times.

An even more important concern regarding the land base/intensive management tradeoff is the opportunity cost of withdrawing from or constraining timber

95-1 production on some 25,000 acres of the commercial forest land base. According to data presented in the EIS, if the proposed intensive management investments were applied to the maximum land base, timber production could be increased by over 30 million board feet per year rather than the 4.9 million foot increase proposed in the preferred alternative. 95-2 The costs to the public are tremendous. The difference between economic benefits generated by such an alternative versus the preferred alternative include $3.5 million in O & C revenues, over $11 million in local income and over 800 jobs. This tremendous difference in benefits can be attributed to the large reduction in the amount of land dedicated to intensive forest management proposed by the BLM. If the funding necessary to implement the proposed intensive management program does materialize, WFIA would like to see it used to stimulate the economy, stabilize dependent communities and finance local governments. This can only be accomplished by maintaining the maximum amount of land in sustained timber production. We are not alone in this thinking. Attached to our input is a copy of House Memorial #1 passed during the regular session of the 1981 Oregon Legislative Assembly. The Memorial to the United States Congress requests that the highest priority in BLM planning be to,"Re-emphasize the importance of community stability, economics, payroll and tax base within Oregon and its individual districts; and make certain every possible effort is made to preserve the intensive management land base for timber production purposes". Clearly, the preferred alternative does not comply with the desires of the Oregon State Legislature. 95-3 Furthermore, it is also inconsistent with the goals and direction provided by the State Department of Forestry's Forestry Program for Oregon. In fact, the preferred alternative falls short of satisfying two of the three basic objectives of the Program (see page 1-26 of DEIS). Maintenance of the maximum commercial forest land base and community stability are sorely neglected in the BLM's proposal.

WFIA shares the concerns of the State Legislature and Department of Forestry over the land base reduction proposed in your plan. We request that the new preferred alternative to be displayed in the Final EIS comply with the Forestry Program for Oregon and with the direction provided by our elected representatives in the State Legislature.

RANGE OF ALTERNATIVES

95-4 The range of alternatives presented in the DEIS is inadequate. The alternative titled "Maximum Timber" does not accurately reflect the desire of those

95-4 attending the "Scoping Meeting" who requested that an alternative be analyzed that maintained the maximum amount of commercial forest land for timber production. It is unacceptable to WFIA and the forestry profession to include TPCC withdrawals in the intensive management base. Including these lands in the intensive management base is also in violation of the O & C Act. An alternative that could properly be called "timber emphasis" would be similar to Alternative One with the 11,900 acres of TPCC withdrawals deleted from the intensive management base. Such was the intent of those at the "Scoping Meeting" that asked for an assessment of the timber production potential of the Eastside Unit. A "timber emphasis" alternative that included roughly 130,000 acres in the intensive timber management base would result in substantial increases in timber production, be consistent with the Forestry Program for Oregon and House Memorial #1, be in compliance with the O & C Act and generally serve the economic needs of communities dependent on a permanent supply of timber. WFIA recommends that such an alternative be displayed in the Final EIS and that serious consideration be given to identifying it as the "preferred alternative".

We were also disappointed at the BLM's reluctance to assess the impact of departing from non-declining even-flow on any alternative other than the preferred alternative. There was strong support at the "Scoping Meeting" for a departure run on the "maximum timber" alternative. 95-5 In order to truly assess the Eastside Unit's timber production potential and ability to comply with the Forestry Program for Oregon, WFIA requests that an alternative be constructed that would depart from non-declining even-flow harvest scheduling assuming that all commercial forest land less the TPCC withdrawals is available for intensive forest management. Such an alternative would be consistent with the request widely supported at the "Scoping Meeting" and with the objective of analyzing an adequate range of alternatives.

WILDLIFE IMPACTS DISTORTED

Consistent with plans prepared on other districts, the Eastside Salem DEIS presents data assessing the impacts on wildlife in a very misleading manner and generally tends to over-emphasize, if not sensationalize the wildlife issue. Specifically, the issue of old-growth habitat requirements and the role of BLM lands in providing such habitat have been overstated. First, according to data presented in the EIS, BLM lands contain only 6 percent of the old-growth timber currently existing in the planning area. Just 27,300 acres out of 440,000 acres of old-growth is controlled by the BLM. Second, the difference in the amount of old-growth

to be harvested during the life of the plan under the "maximum timber" alternative is just 1,600 acres more than what would be harvested under the preferred alternative. Even under the "maximum timber" alternative, over 19,000 acres of old-growth would be in tact at the end of the ten-year plan. 95-6 In other words, all that stands between the BLM's proposal to increase timber production by 4.9 million board feet versus 30 million board feet is just 1,600 acres of old-growth. This seems like a small price to pay for the tremendous economic benefits that would result. The third factor is that, according to data presented on page F-1 of the DEIS, the character of wildlife habitat in the area of BLM ownership will remain virtually unchanged during the life of the plan no matter which of the seven alternatives is adopted. None of the alternatives would jeopardize any species of wildlife through the ten-year planning period.

While the impacts of this plan clearly pose no threat to wildlife, one would think otherwise based on the way data are presented in the DEIS. For example, on page 3-24, we are told that Alternative One protects "0" spotted owl locations during the first decade of the plan. Yet, over 19,000 acres of old-growth will remain after one decade! Are we to believe that 19,000 acres of virgin timber will not protect any owls? Based on the limited knowledge of the habitat requirements of the owl, we find it surprising that such precise predictions of how the owl will react to each alternative can be published in an EIS. 95-7 We are also curious as to why the only areas inventoried in the latest spotted owl count were those that supported owls at sometime during the last several years. Why hasn't the entire district been inventoried? Isn't it possible that some owls changed nesting sites or were away from their nests when the new inventory was conducted? It seems incredible to us that such exact data can be espoused based on such an inexact procedure. The DEIS on page 2-16 even makes predictions as to when locations currently supporting owls will be deemed to be no longer acceptable by the current occupants. Were the owls polled to obtain this information?

WFIA requests major revisions in the Final EIS and the new preferred alternative to reflect a more accurate assessment of the old-growth issue. None of the suggested alternatives pose a threat to the integrity of wildlife habitat during the life of the plan. None of the existing spotted owl locations need be impacted under any of the alternatives during the next ten years. No species would be threatened by even the most intensive timber production alternative during the decade this plan will be in effect. Why, then, should management of nearly 20,000 acres of old-growth be severely constrained to preserve it in an old-growth condition at the expense of several hundred jobs, increased timber production, local earnings, government revenues, and general economic stability?

TENTATIVE DECISION

The preferred alternative to be displayed in the Final EIS will constitute your tentative decision. Therefore, it is imperative that major revisions be made in the content of the preferred alternative as well as the environmental analysis contained in the DEIS. We recommend that the new preferred alternative maintain the maximum amount of commercial forest land in the intensive management base while keeping with environmentally sound principles. Management intensity should be applied at the maximum level consistent with anticipated funding levels and in an economically efficient manner. Departures from non-declining even-flow should be fully analyzed on the new preferred alternative in order to comply with the Forestry Program for Oregon. Most important, withdrawals from the intensive management base and constraints on timber management should be carefully reconsidered. Possible impacts on wildlife should be described in the proper context and accurately displayed in the EIS. The primary criteria in developing the tentative decision should be the impact the plan will have on local communities, employment, economic stability, compliance with the O & C Act and House Memorial #1.

Western Forest Industries Association appreciates the opportunity to participate in your decision making process and hopes these comments will help you in preparing a plan that will be responsive to the needs of Oregonians.

Very truly yours,

WESTERN FOREST INDUSTRIES ASSOCIATION

Jim Geisinger

Jim Geisinger
Forester

Enclosure

cc: Robert Burford
William Leavell

Response to comments in Letter 95.

95-1	See Common Issue 1.
95-2	The differences are overstated here. See Appendix O for tradeoffs involved.
95-3	See response to comment 13-1.
95-4	See response to comment 46-2.
95-5	See response to comment 46-2.
95-6	See Common Issue 2.
95-7	See responses to comments 30-3 and 46-10.

96

1645 Oak Street
Eugene, Oregon 97401
March 23, 1982

Mr. Joseph C. Dose, District Manager
ATTENTION: EIS Team Leader
U.S.D.I., Bureau of Land Management
Post Office Box 3227
Salem, Oregon 97302

Dear Mr. Dose:

Attached are my comments pertinent to the Eastside Salem Draft Timber Management EIS. While I have focused on certain inadequacies in the draft, it seems to be more a matter of choosing the data to be displayed in the Draft, rather than it not being available. The Planning Team has always responded to my information requests in a truly friendly fashion.

If anything, my primary concern is having adequate displays for the public in the DEIS and FEIS which detail the tradeoffs or opportunity costs associated with competing resources. While a situation boils down to owls or timber, the public should benefit from the Planning Team analysis of what one or more pair of owls might forego in timber receipts, jobs, et cetera. I have included some graphs and reference material with my following comments. Some tables provided by the Planning Team are also included which may be appropriate for the Timber Management FEIS.

Sincerely yours,

Gerald Gruber

Gerald J. Gruber
Forester

GJG:cs

Encl.

cc: Mr. William G. Leavell
Mr. Robert Burford

THE PROPOSED ACTION

Superficially, those people, jobs and timber-dependent communities may see fit to endorse the Proposed Action for its increased timber harvest volume. After looking beyond the 4.8MMBF harvest increase, however, the basic data is non-supportive of the increase. The combination of Intensive and Constrained acres for timber management are less than the No Action Alternative (No. 7) for current activities. The attached graph labeled Exhibit 1, displays the relative volumes of acres and timber harvest for each Alternative. It seems clear the Proposed Alternative assumes a greater harvest volume per acre as does every alternate displayed, with Alternative No. 4 the only exception.

Also critical is that total timber-harvest acres are less in the Proposed Action than they exist in No. 7. Even worse, the Constrained acre total nearly doubles from 9,879 (Alternative No. 7) to 18,696 acres. Constrained acres are managed for far less timber production than Intensive acres, perhaps as low as 10 percent of normal. 96-1 The DEIS does not display the harvest volume per acre per decade for the Intensive or Constrained Acres. By inference, Alternative No. 1 has only Intensive harvest acres for an arithmetic average of 835 Board Feet harvest/Acre/Year. The FEIS should display the similar average for Constrained harvest production.

We endorse the use of intensive timber management practices and herbicides which efficiently increase timber production per acre. Funding should not be presumed however, in either the near or long-term from Congress, nor from O & C receipts as we have seen recently. Neither should intensive timber management be used as a means to forego timber management all possible acres, and increase the harvest per acre as Exhibit 1 shows.

TIMBER STATUS

96-2 A basic timber inventory should be displayed in the FEIS, as was obtained from the Salem Planning Team. The DEIS displays in Table B-1, on page B-2, an acres X age class which relates more to wildlife aspects than it does timber management. We question the real worth and accuracy for tree age beyond 400 years. The public should be shown in the FEIS how the approximately 4.5 billion board feet of standing timber in the Salem Eastside planning unit is distributed by age class.

Attached Table 1 shows 2.272 billion board feet in trees 100 years and older plus an additional 926 million board feet in timber 400 years and older. Silviculturally and economically these two broad categories are appropriate for timber harvesting.

Additionally, Table 1 indicates a high volume per acre in the 200+ year groups, indicating harvest is practical and appropriate. Actually, for 21,698 acres and 1,761,110 MBF the average is 81.165 MBF/Acre. Conversely, the lower volumes per acre in the 30-100 year age categories indicate a yield per acre shortfall where 96-3 either intensive management or timber-stand replacement should occur. The FEIS should display in detail the Timber Management silvicultural goals for the age classes where low, as well as volume per acre objectives and yields on Intensive and Constrained designated management areas. Kept in the timber intensive land base, these lower volume per acre areas would be candidate areas for Congressional funding and management.

96-4 We urge adoption in the FEIS a modified Alternative No. 1 to replace the Proposed Action. In actuality our proposal was made at the July 14, 1981 Scoping Meeting but was incorrectly described in subsequent writings and in the DEIS, Appendix. A truly intensive Timber Management Plan should be analyzed using 141,836 acres of the Intensive timber base minus Fragile Site and Reforestation withdrawals of 10,958 acres and 953 acres respectively. Resultant timber harvest would then be based on 129,925 acres as requested at the Scoping Meeting. As mentioned earlier, a production of 835 Board Feet/Acre/Year from Alternative No. 1 could yield 108.46 MMBF from a 129,925 acre land base. This Modified Alternative preserves appropriate sites and develops a true picture for the Eastside potential harvest. Furthermore, it is more than 22MMBF than currently available for harvest and 17MMBF more than the Proposed Alternative.

96-5 One technical facet of the forest inventory, yield or computer model needs scrutiny prior to completion of the FEIS. It concerns the mathematics of conversion of cubic feet to board feet. A ratio of 6.37 is consistent through all Alternatives as is appropriate for sake of comparison. However, the attached data from Bulletin 201 subsequent graph indicate a ratio of 6.37 is more appropriate to timber averaging 12.6"DBH and not that in Salem Eastside for the first decade. Paragraph 2 on page I-4 describes a 15"DBH tree in 60 years and 17"DBH in 70 years for the Eastside. Clearly, both size/age designations differ from Bulletin 201 basis. The problem affects the board foot offerings made each year in the first decade as calculated by the SIMIX model and cubic foot timber data.

Bulletin 201 as graphed indicates the conversion ratio should be closer to "7.0". If so, the board feet of harvest in each of the Alternatives should all be increased by 9.89 percent; a significant annual volume. If Bulletin 201 was not used by the Planning Team, what is the basis for the "6.37" ratio used in the East-side Plan? Plans from the U.S. Forest Service use a typically lower ratio often in the 5.8 ± range, a drop of 8.9 percent. The Planning Team noted in the Question and Answer session March 2, 1982 that both cubic foot and board foot data were measured on field inventory plots. Accuracy aside, there still remains a technical variance of significant magnitude which could alter annual harvests by millions of board feet.

TIMBER HARVEST AND/OR OWLS

The TMDEIS has severely over-reacted to the very limited research conducted on spotted owls. Certainly research will continue and accelerate on this species in the coming decade to give us a complete picture of its habitat needs. There is little urgency to call a full halt to mature and old growth timber harvesting while riparian, visual, TPCC and fragile preservation sites exist. The costs in timber, jobs and community income are simply too high for at best, tentative conclusions on habitat needs in the short term.

Response to comments in Letter 96.

96-1 Annual harvest and productivity levels for acres subject to timber harvest during the first decade would be as follows:

	Intensive Base			Constrained Base		
Alt.	Acres	Allowable Cut (MM bd. ft.)	Annual Productivity AC. ÷ Acres (bd.ft./ac./yr.)	Acres	Allowable Cut (MM bd. ft.)	Annual Productivity AC. ÷ Acres (bd.ft./ac./yr.)
OPA	102,901	84.5	821	18,696	6.4	342
1	129,808	121.2	994	0	0	0
2	102,288	83.9	820	20,805	9.2	442
3	108,944	88.9	816	7,520	3.0	399
4	70,099	56.5	806	43,480	7.7	177
5	102,901	92.7	901	18,696	6.4	342
6	102,901	79.4	772	18,696	6.4	342
7	120,329	84.3	701	9,879	1.8	182
8	107,345	88.1	821	7,696	5.2	676

96-2 Table B-1 was designed to display all BLM-administered forest land acres inventoried in the Eastside Planning Area. In addition to conifer base lands, hardwood and fragile site/withdrawn lands are included. A tabulation of standing volume by age class is available for review in the Salem District Office.

96-3 Silvicultural goals for 30- to 90-year-old stands in the intensive and constrained bases include commercial thinning before stems of merchantable size become seriously stressed from competition; fertilizing thinned or well-spaced stands where soil samples indicate less than 50 parts per million of available nitrogen; maintaining 30 to 40 percent crown ratios on dominant and codominant trees; and retaining 150 to 200 stems per acre for final harvest in stands scheduled for one or more intermediate harvests.

Because these 30- to 90-year-old stands have, for the most part, naturally regenerated with little or no early spatial management (precommercial thinning), neither large growth increases nor dramatic allowable cut effects (see Appendix B, page B-5) are expected from future manipulation. The 30- to 90-year-old stands are in their period of greatest volume growth. They are important because they must sustain harvest levels during the transition from harvesting existing over-mature stands to harvesting higher-yielding stands of the future.

96-4 See response to comment 46-2.

96-5 The board foot/cubic foot ratio of 6.38 is based upon actual inventory yield data. Units of measure are in BLM (16-foot) Scribner board feet and cubic feet for each Eastside SYU, separately. The ratio relates directly to the projected first decade harvest for the new preferred alternative. The ratio is the first decade Scribner equivalent of an even-flow harvest projected in cubic feet. The ratio will decline over time as harvests of younger, smaller timber increase. In the original cut calculations which contained all commercial forest lands (no lands withdrawn and no management constraints for multiple-use considerations), the BF/CF ratios were 6.25 for the Clackamas-Molalla SYU and 6.46 for the Santiam River SYU. In the new preferred alternative cut calculations which were made on a reduced land base, these ratios changed to 6.25 and 6.47, respectively. These 6.25 and 6.47 ratios were the basis for the composite 6.38 BF/CF ratio, which was used for all Eastside EIS alternatives.

The 15" DBH tree in 60 years and 17" DBH tree in 70 years described on page 1-3 relate to future managed stands. The data presented in Bulletin 201 are based on natural stands and do not reflect the effects of management practices such as spacing control, use of genetically superior trees or fertilization.

In comparing the Eastside 6.38 BF/CF ratio with other ratios, there is a significant difference between BLM's 16-foot log Scribner volume and other possible measurement standards. For example, if the BF/CF ratio were generated by comparing the first decade harvest in International 1/8-inch log rule to cubic feet, the ratio would likely be 7.5 on a 16-foot log basis. If the comparison were 32-foot log Scribner to cubic feet, the first decade ratio would probably be between 5.5 and 6.0 and would be comparable to Forest Service data.

ASSOCIATION OF O & C COUNTIES

97

COMM. DALE D. SCHROCK, PRES.
BENTON COUNTY COURTHOUSE
CORVALLIS, OREGON 97330
PHONE 503-757-6800

COMM. BEN F. MAGILL, V. PRES.
POLK COUNTY COURTHOUSE
DALLAS, OREGON 97338
PHONE 503-623-8171

COMM. F. E. KNIGHT, TREAS.
TILLAMOOK COUNTY COURTHOUSE
TILLAMOOK, OREGON 97141
PHONE 503-842-5511

RAY E. DOERNER, EXEC. DIR.
486 HEYDON ROAD
ROSEBURG, OREGON 97470
PHONE 503-673-5286

DAVID S. BARROWS, COUNSEL
SUITE 200, CENTURY TOWER
1201 S. W. 12th AVENUE
PORTLAND, OREGON 97205
PHONE 503-227-5591

March 22, 1982

Salem District manager
Attention EIS Team Leader
Bureau of Land Management
P. O. Box 3227
Salem, Or. 97302

Dear Joe,

On behalf of the Association of O&C Counties (the Association) the following response to the Draft Environmental Statement (DEIS) of the Eastside Salem District is here-with submitted.

As you know, the Association represents the interests of the 18 Oregon Counties in which the O & C and other related Western Oregon BLM lands lie. One major objective of the Association is to promote optimum levels of economic and social benefits to the communities, now and into perpetuity.

The current economic slump is a grim reminder of the need to be involved in the decision making process for managing these precious O&C lands. We appreciate this opportunity to comment.

In the past, comments on the Draft Statement have been limited to scope, adequacy, and accuracy. Advocacy of a particular alternative or combination came after the Final Statement (FEIS) had been published. That FIES rightly refined the DEIS with additional data and explanations to questions derived from the responses to the DEIS. It is our understanding that the FEIS will now, in effect, become a combination FEIS-Draft Decision Document (DDD). That being the case, commentors must make their decision recommendations from DEIS data and information which may or may not be complete or accurate.

GENERAL COMMENTS

The Association has not attempted to develop it's own Alternative for the Salem Eastside. We believe that the policies and criteria used in the Association's response to the Coos District Proposed plan is generally applicable to the Salem Eastside. Your staff is familiar with that proposal (copy enclosed). Among other suggestions, it provides for a restricted level of management in the riparian zones; restricts the VRM areas to only those zones so designated by the Oregon Transportation Department; provides sufficient habitat for the threatened Northern Spotted Owl and other old growth dependent species by locating the SOMAs adjacent to or near other authorized or restricted acreages, i. e. fragile sites, NRAs, etc. It also schedules some harvest

in the constrained harvest base via Area Control rather than the usual Even Flow method. We urge that you give serious consideration to this harvest method and test it on your SIMIX computer model. It usually reaches the regulated age class sooner; provides greater output during the conversion period; and reduces mortality losses.

LEGAL COMMENTS

97-1 The DEIS appropriately lists the various laws and authorities governing the management of the O&C lands. It also includes the Bureau's Draft Policy Statement and the subsequent Solicitor's Momorandum. Presumably, the Draft Policy Statement and the Solicitor's response were used as guides in the development of the Proposed Action (PA). We submit that the PA is not in compliance with either the O&C Act or the Policy Statement as interpreted by the Solicitor.

(1) It appears that the PA was developed on the assumption that the Solicitor's Memo was a complete ratification of the Draft Policy Statement. This is not so. On page A-11 of the Solicitor's Memo, the conclusion states ;

> " Our review of the draft policy statement for management of the O&C lands indicates that only minor modifications are necessary to bring it into line with this legal analysis. As stated earlier in this memorandum, the Bureau has the responsibility to see that its operations bring together the dominant use of forest production with those aspects of multiple use envisioned by the O&C Act in addition to any relevant requirements specified in subsequent legislation. We believe that the Bureau has struck this balance in much of its proposed policy."(Emphasis added).

Note that the Solicitor refers to "any relevant requirements specified in subsequent legislation". Also, on page A-10 (first paragraph), the Solicitor appears to endorse the Policy Statement dealing with wildlife protection goals, but note that he is again refering to an authorized objective.

We are not aware of any authorizing legislation endorsing the use of O&C lands for Eco-system Management including Wildlife Habitat Corridors; we know of no BLM-State Cooperative Agreement dealing with fish and wildlife as envisioned by the Sykes Act and referred to by the Solicitor.

(2) We disagree with the Solicitor's Memorandum that the Visual Resource Management areas (VRMs) are "Recreational Facilities as intended in the O & C Act.

97-2 (3) The DEIS discusses the Bureaus effort toward meeting the "Consistency Clause" of Sec. 202 (c) of the Federal Land Planning and Management Act. Table 1-7 acknowledges that the PA does not meet that mandate. The "Consistency Clause" is strong language. If, by chance, the DDD is not consistent, the FEIS must explain what other over-riding Federal law or laws negate the applicability of FLPMA.

LAND USE ALLOCATION AND INTENSIVE MGT.

The allocation of land for the various uses is the single most important component of a plan. The intensive management level that is applied to the remaining forest land acres determines the level of harvest.

The triple mixing of the several Intensive Timber Production Bases, the various levels and acreages of Constrained Bases, and the different levels of Intensive Management displayed on Table 1-2 is frustrating and confusing. For example, Alternatives 1 thru 4 are sequential in so far as the Annual Harvest is concerned but not in the land allocation scheme. Had the land allocations in Alternatives 2 and 3 been in reverse and other management practices remained the same, the Annual Harvest in Alt. 2 would have increased by at least 7 or 8 MMbd. Ft.

97-3 The Association believes that the Annual Harvest derived from each Alternative should be displayed without treatment. Then, by adding various Intensive Management practices to each, the public and the decision maker can more logically determine the appropriate Management Plan.

FUNDING and BENEFIT-COST DATA

Historically, the funds for management of the BLM's Western Oregon lands has been an annual appropriation equal to 25% of current receipts. Not knowing what the future holds, given the present depressed condition of the wood products market, the desired level of funding may not become a reality. If such is the case, harvest levels will fluctuate regardless of the Adopted 97-4 Plan. The Association believes that the Adopted Plan should be predicated upon full funding, but it should have built-in flexibility with a prioritization of the various management practices contemplated.

97-5 The DEIS is also deficient in that it shows no Benefit-Cost ratios for each Alternative. Total Costs and total Benefits are absent as well. Such information must be available to the decision maker prior to the publication of the FEIS-DDD.

MFP WITHDRAWALS AND OTHER LAND-USE CONSTRAINTS

As noted in the Solicitor's Memo, the Bureau should make every attempt to overlap the use of legally withdrawn lands to meet the goals of differing authorizing legislation before withdrawing lands from the Productive Land Base.

The Association has not defined the exact location of each of the withdrawn parcels. It appears, however, that the withdrawn lands plus the constrained harvest lands is far in excess of the actual needs of other authorized uses. For example, wildlife needs are not too dis-similar from those of the Coos BLM District. In that case, professional help indicated that the District was also over-allocating acreages for these special uses. A copy of the Associations Coos response in here-with attached. Please refer to pages 10 thru 20 and particularly note the discussion of the proposed corridor system.

SOME MISCELLANEOUS ISSUES

97-6 (1) The Eastside DEIS continues, as have other Draft Statements, to use the phony comparison of "Existing Condition" against the other Alternatives. The use of 1976 - 1978 data is no more realistic than predicting what might be the case in 1986 - 1988. The true comparison is Alternative 7 (No Action).

Accordingly, data such as that displayed in Tables 3-18 and 3-19 are useless and reduce the credibility of the document.

97-7 (2) Because of many factors, individual Sustained Yeild Units may well be obsolete in-so-far as they relate to log market areas. We believe that the effects of combining the Clackamas-Molalla and Santiam SY Units for allowable cut purposes is worth exploring.

97-8 (3) Alternatives 5 (Departure) and 6 (No herbicides) are not true Alternatives. They are simply modifications of the PA and should be tested against the other Alternatives as well.

SUMMARY

(1) The DEIS is sufficient in scope.

(2) All Alternatives need not meet existing legal authority but the DDD should and the Final Decision must.

(3) Co-mingling of land-use data with intensive management levels make a mixed bag. They should be separated.

(4) Costs and Benefits are not shown.

(5) Management practices should be prioritized.

(6) MFP withdrawals and wildlife habitat areas appear to be beyond actual needs.

(7) The term "Existing Condition" is inappropriatly used.

(8) Consideration should be given to combining the data from both SYUs for computation of the allowable cut.

(9) Alternatives 5 and 6 should be stricken and become sub-alternatives of the remaining Alternatives.

97-9 (10) The possibility of fertilization of natural stands should be studied.

CONCLUSION

With minor modification and expansion as here-with suggested, the Association believes that the DEIS is sufficient in scope, detail, and accuracy from which an informed decision can be made.

The Association further believes that (1) the Final Plan should maintain an Intensive Land Base as near to the existing 120,327 acreage as is consistent with other currently authorized uses; (2) Intensively manage at the level proposed in the PA; (3) Riparian areas should be managed but on a constrained bases; (4) Visual protection corridors should be limited to those travel routes so designated by the Oregon Department of Transportation and should be managed on an extended rotation.

With the above criteria, the harvest level is estimated to be from 10% to 15% above the Proposed Action.

Finally, we commend you and your capable staff for their tenuous and forthright effort in the development of an acceptable document. We apologize for our many references to the Associations response to the Coos Final Statement. But then, after all, we were put through a similar obsticle course in responding to your Salem Westside Final. Ha.

Thank you for the opportunity to respond and if we can be of assistance, please let us know.

Respectfully submitted,

Ray E. Doerner

Response to comments in Letter 97.

97-1 See Common Issue 5.

97-2 See response to comment 13-1.

97-3 The suggested analysis will be displayed for the decision in the Eastside Salem Record of Decision.

97-4 See Common Issue 1.

Intensive management practices have been prioritized based on their long-term effects. Guidelines for ranking include the following:

1. Intensive practices such as site preparation, planting and plantation maintenance are prerequisites for other practices.
2. Practices such as planting and genetic tree improvement are on-going, and the timing of a sequence of accomplishments is critical to both the cost and success of these programs.
3. Practices such as site preparation and plantation maintenance, planting, genetic tree improvement and precommercial thinning are applied early in the life of a stand and prepare the stand for optimal growth. These practices are most effective in increasing growth over the long term. Although intensive practices such as commercial thinning and fertilization applied to mid-aged natural stands provide for a faster return on investments, these treatments should generally not be carried out at the expense of management opportunities in younger stands. The actual treatments, in order of priority, are: site preparation, planting and plantation maintenance; genetic tree improvement; precommercial thinning; commercial thinning; and fertilization. These priorities are subject to change based upon the results of monitoring during the decade.

97-5 An economic efficiency analysis is summarized in Appendix N.

97-6 See response to comment 19-1. Both comparisons are useful and relevant to impact analysis and decision-making.

97-7 See response to comment 46-6.

97-8 Analyzing an additional eight alternatives would have added substantially to the cost of EIS preparation and made the EIS more complex and difficult to understand. This would have exceeded a reasonable array of alternatives.

97-9 The fertilization program is and always has been recommended only for those forest stands deficient in nitrogen. The decadal program is limited to soils containing less than 50 parts per million (ppm) of mineralizable nitrogen. Studies have shown that application of fertilizer to stands exceeding 50 ppm produces little or no response. The nitrogen-deficient areas with highest priority for fertilization are those which have been previously thinned or have nearly ideal spacing and stocking levels, and those where entry for commercial thinning or final harvest is not planned for 10 to 20 years after fertilization. Other candidate stands include those which have nutritional imbalances caused by prior management practices such as burning, scarification or herbicide application.

98

HERB HOFFER
904 NORMAN NE.
SALEM OR. 97301

SALEM DISTRICT MANAGER
ATTENTION E.I.S. TEAM LEADER
BUREAU OF LAND MANAGEMENT
P.O. BOX 3227
SALEM, OREGON 97302

SIR:

Upon Review of the DEIS for Eastside Salem, and after visiting the BLM office for the review & discussion session, I have several comments.

I support the adaptation of Alternative 4, or an alternative with similar emphasis on preservation of wildlife through maintaining the existing stands of old-growth timber. Also, I support protection of riparian areas and believe that it is critical to protect our watersheds.

The roadless area around Table Rock is of great value and should be protected, as should the Crabtree Valley area. These are excellent examples of remaining old-growth stands.

98-1 I believe the practice of manual vegetation control has merit and should be integrated into the management plan, perhaps in a way which would allow comparison with herbicide management. Thank you for your consideration of these "latish" comments.

Sincerely,
Herb Hoffer

Response to comments in Letter 98.

98-1 See response to comment 87-3.

A comparison of manual and chemical control methods will be included in the draft western Oregon BLM vegetation management EIS which will soon be available for review.

100

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
Portland Field Office
727 N. E. 24th Avenue
Portland, Oregon 97232

Reference: ES

March 23, 1982

MEMORANDUM

To: District Manager, Bureau of Land Management
Salem, OR (Attn: EIS Team Leader)

From: Field Supervisor, Division of Ecological Services
Portland Field Office

Subject: Review of Draft Environmental Impact Statement for
Eastside Salem Timber Management Plan

We have reviewed the subject Draft Environmental Impact Statement (DEIS) and provide the following comments for use in preparing the final statement.

In general, the DEIS adequately describes the proposed action, possible alternatives, the affected environment, and environmental consequences of all alternatives. Alternative 4, which strongly emphasizes wildlife values, would provide the greatest benefit to resources of concern to the Fish and Wildlife Service. However, the proposed alternative would also slightly improve existing conditions for fish and wildlife resources.

100-1 Although it is not noted in the text, we assume the candidate plant list reflects the changes found in the 1980 Notice of Review (Vol. 45, No. 242, pps. 82480-82569).

The riparian corridor is of critical importance to the greatest variety and number of fish and wildlife species of any habitat type. Of special importance are Columbia basin salmon and steelhead which have been identified by the Fish and Wildlife Service as the number 1 important resource problem in the nation. Every effort, therefore, should be made to maximize the protection, restoration and enhancement of the riparian corridor for fish and wildlife resources.

We strongly recommend incorporating into the proposed alternative the riparian protection that would be given under alternative 4. The increased protection would only affect approximately 1.6% of the BLM land base. Fish and wildlife benefits in this relatively small but critical area should far outweigh costs. This is especially true when considering benefits to critically important runs of salmon and steelhead.

We appreciate the opportunity to review and recommend improvements which will maximize fish and wildlife resources in concert with other land uses. If we can be of any further help, please notify David M. Sill at (FTS) 429-6179.

Russell D. Peterson
Russell D. Peterson

cc:
NMFS
ODFW

Response to comments in Letter 100.

100-1 The candidate plant list reflects the changes found in the 1980 Notice of Review (Vol. 45, No. 242, December 15, 1980/Proposed Rules). BLM will continue to use the most up-to-date lists available.

101

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
ENVIRONMENTAL & TECHNICAL SERVICES DIVISION
847 NE 19th AVENUE SUITE 350
PORTLAND, OREGON 97232
(503) 230 5400

March 24, 1982 F/NWR5:JS

Mr. Bob Saunders, EIS Team Leader
Bureau of Land Management
Salem District Office
P. O. Box 3227
Salem, Oregon 97302

Dear Mr. Saunders:

The National Marine Fisheries Service (NMFS) has reviewed the draft environmental impact statement for the Eastside Salem Timber Management (USDI, BLM).

In order to provide as timely a response to your request for comments as possible, we are submitting the following comments to you directly, in parallel with their transmittal to the Department of Commerce for incorporation in the Departmental response. These comments represent the views of the National Marine Fisheries Service. The formal, consolidated views of the Department should reach you shortly.

We are in concurrence with a choice of action which would improve conditions for anadromous fish in the units so managed. In view of the negative impact of past management practices, and the relatively large proportion of cold water fish habitat presently in less than good condition, it would be reasonable to place more emphasis on protection of instream and riparian habitat. We ask therefore that the riparian protection offered by Alternative 4 be substituted in the proposed action.

The extended protection of riparian and aquatic habitat provided by Alternative 4 would require a modest additional expansion of the riparian zone from the proposed 8,400 to 10,900 acres (page 1-1) of 2,500 acres. This amounts to approximately 1.6 percent of the 159,898 acres administered in the units by the Bureau of Land Management. The accompanying decrease in excessive sediments and improved streambed structure would increase stream productivity above the level resulting from the proposed action. This could be achieved at a reasonable cost which would likely be offset by the value of increased anadromous fish production.

General Comments

In our opinion the draft environmental impact statement lacks sufficient detailed information upon which the reviewer can base an evaluation of the potential impacts of the proposed action on anadromous fish resources. The presentation seems extremely fragmented, and it is impossible to derive any specific idea of the plan.

101-1 For instance, the total area of the riparian habitat is given but there are no maps or locations. No criteria for setting the bounds of the protective buffer zones are given. Details which would allow for evaluation of impacts on key fish producing streams are not included. The relationship of road building and planned stream crossings to fish spawning and rearing areas is not disclosed.

Special attention should be given to establishing the buffer zones, particularly in areas of fragile soils. Road building and other soil disturbances should be avoided in such areas. If aquatic habitat rehabilitation measures are not presently being contemplated, logs not suitable for timber could be used to provide instream cover for fish where habitat conditions are poor due to lack of cover. This could accelerate the development of natural habitat.

Specific Comments

101-2 Page 2-3, SOILS. There is no description of the soil associations listed. Locations of the soils most likely to affect aquatic habitat, major sediment sources, and the streams which would be affected should be included. These sensitive areas need to be identified and specific measures to protect them should be discussed.

101-3 Page 3-23, Fish. Description of the measures which will be taken to mitigate the effects of 5 miles of road on fragile soils adjacent to streams with fishery values and of the 97 stream crossings projected in the sample 5-year timber sale plan, if the proposed action is adopted, should be included in this section.

Thank you for the opportunity to provide these comments. We hope that you will be able to incorporate them into the final management plan. We particularly urge that the protection of riparian and aquatic habitat be increased to the level offered by Alternative 4.

Sincerely yours,

Merritt E. Tuttle
for
Dale R. Evans
Division Chief

Response to comments in Letter 101.

101-1 See response to comment 18-4.

At this stage of planning, none of the alternatives are specific enough to predict impacts on individual streams. More specific evaluations will be included in site-specific environmental analyses preceding every timber management action.

101-2 Soil associations were not used as the basis for impact analysis in the EIS, since a more relevant inventory of fragile areas, conducted through the TPCC process (see page B-1), was available. The acres of fragile areas listed in Table 2-2 include soil locations most susceptible to eroding and sliding into aquatic habitat. All of these soil locations are identified on district TPCC maps which are consulted during the environmental analysis preceding each specific timber management action. Several measures which could be employed to protect these areas are listed on page 3-2.

101-3 See response to comment 18-11.

102

Oregon Wilderness Coalition

Main Office, 271 West 12th Avenue, Eugene, Oregon 97401 (503) 344-0675
Metro Office, Dekum Building, 519 SW 3rd Avenue, Suite 706, Portland,
Oregon 97204 (503) 224-0201
Eastern Oregon Field Office, Box 9, Prairie City, Oregon 97869 (503) 820-3714

23 March 1982

Joe Dose, District Manager
Salem District BLM
1717 Farbray Road SE
PO Box 3227
Salem, Oregon 97302

Dear Mr. Dose,

Please consider these comments in the revision of the Timber Management Draft Environmental Impact Statement for the Eastside Salem sustained yield units. We ask that these comments be included in the Final EIS.

Law requires the Bureau to consider the problems and possibilities of multiple use forest management, particularly the protection of watersheds, the regulation of stream flow, the protection of endangered species of plants and animals, and the consideration of economic and recreational needs. Wise management of the public lands would also dictate that a comprehensive multiple use strategy be developed for the Eastside Salem SYUs. If for no other reason, this should be done because of the myriad of unknown ecological interrelationships, and political and economic possibilities for the future. It is these unknowns which mandate extreme care in planning significant manipulation of the land.

In this light, the Eastside Salem Timber Management DEIS is extremely inadequate. It is a plan for only one resource, timber, with incomplete "band-aid" measures to lessen the impacts of timber production on other resources. This may have been acceptable fifty years ago when timber cutting activities were not so widespread, but we are now facing a time when non-timber resources are seriously threatened by the overwhelming use of the forest for timber production.

We understand that it may be too late to change the process for the Eastside Salem SYUs, but we wish to express our disappointment with the archaic mode of planning that has been chosen, and we hope that this method will not be used in the future.

Below we have listed our comments concerning the range of alternatives in the DEIS and the treatment of the various forest resources and land allocations.

RANGE OF ALTERNATIVES

In reviewing this and other planning documents published by the agency, we are repeatedly impressed with the fact that the "alternatives" offered are blatantly biased towards the timber resource. This is especially surprising given the introduction to the DEIS (page xiii), which says, "A preferred land use alternative, selected during the planning process, provides the basis for the EIS proposed action. Seven other alternatives have been identified, providing a wide range of options for review and consideration." (empahsis added)

The alternatives presented in the DEIS are in no way a wide range of alternatives. While a "Maximum Timber Production" alternative is presented, no "Maximum Emphasis on Non-Timber Values" alternative is included. The "Strong Emphasis on Wildlife and Other Non-Timber Values" alternative fails pitifully to represent a management alternative which will be the best for wildlife and other non-timber values. Because of this, there is no way to evaluate the real impacts of the proposed action

102-1 on those values. A "No Harvest" alternative should also be included as a gauge by which we may judge the proposed and other alternatives for their impacts on the land.

102-2 Finally, we ask that you produce an alternative which assumes current funding levels. We often see mangement plans which assume that "pie-in'the-sky" funding will just appear to cover the proposed activities. Reality does not always follow this prescription, however, and it would be valuable to see what can be accomplished in the planning area given the very real constraints of budget. We are especially concerned about proposed monitoring and research. History has shown that these activities are severely limited or eliminated by budget cuts. We would like to see how this situation will be avoided for the planning area.

RESOURCES

Watershed

102-3 We would expect the fact that there are twenty municipal watersheds in the Eastside Salem SYU's would mandate particular care in the maintenace of water quality. Although localized impacts to the stream are acknowledged, there isn't any substantive discussion of the cumulative impacts, or any program for assuring that water quality is maintained or improved.

Until it is admitted that the sum of the localized impacts to streams represents an overall degradation of water quality, the management of the water resource will continue to be inadequate. The EIS should discuss goals for water management, including quality/quantity production guidelines.

102-4 Riparian zones are ex tremely important for their habitat values, their protection of fisheries and water quality, and their contribution to the organic food chain in streams. Specific guidelines for management of riparian zones need to be established.

The EIS should direct managers to determine the width and composition of streamside buffers on a site-specific basis, with primary conseration given to protection of fisheries, wildlife, and water quality. The proposed buffers should be evaluated for their contribution to the structure of the stream, regulation of stream temperature and organic production, and the organic matter that they contribute to the stream. The impacts of the proposed management activities in the area on the amount of plant and animal detritus entering the stream should also be examined.

Fisheries

The DEIS mentions that fish habitat has been degrated by logging, roads, mining, and dams in the past, and that the SYUs are currently producing an estimated 57% of potential for native salmonids. It also mentions that special concern has been expressed for the coho salmon, which is declining.

102-5 There are, however, no measures outlined which present a positive program to maintain and enhance fisheries. In fact, all indications are that the agency will continue to degrade fisheries in the SYUs. For example, on page 3-23, it says, "Analysis of the sample 5-year timber sale plan indicates approximately 5 miles of road would be built on fragile or unstable soils adjacent to streams with fishery values.... New roads in the sample 5-year timber sale plan would cross 97 streams with fishery values. Twenty-five roads would cross headwall areas." Table 3-7 indicates that fisheries will not be further degraded. What measures will ensure this?

102-6 What areas in the SYUs are prone to slumps and slides? What special measures will be taken to prevent mass failures in these areas?

The statement (p. 3-22) that, "(t)he proposed action and all alternatives except 1 provide varying degrees of riparian zone protection, thereby assuring a continual replenishment of structure in streams inhabited by fish," is extremely vague.
102-7 What measures are planned to assure that supply of structural elements in the streams? The latest research indicates that structural elements are extremely important in streams, and it has been suggested that merchantable-sized trees be dropped into streams in order to provide for optimum pool habitat and nutrient levels. In there a plan to do this in the fish bearing streams of the SYUs?

Wild and Scenic Rivers

The 1979 directive regarding potential Wild and Scenic Rivers instructed the federal land management agencies to study the rivers flowing through federal lands for possible inclusion in the Wild and Scenic Rivers System. While the DEIS outlines management of the ½-mile buffer along the SYUs' five potential Wild and Scenic Rivers (Sandy, Salmon, Clackamas, North and South San tiam), it does not outline the process by which these rivers will be studied. This is in direct
102-8 violation of the presidential directive.

In addition, there were more rivers suggested as possible Wild and Scenic Rivers as part of Phase II of the National Inventory. These Phase II rivers should be acknowledged as well.

Meadows, Wetlands, Talus Slopes and Cliffs

102-9 The fact that management activities may impact meadow, wetland, or talus slope and cliff habitat is mentioned. We suggest that the agency take one further step and evaluate exactly what will be the impacts to these habitat types. The management plan should be adopted which best protects these habitat types. Leaving management of these areas to be dictated by individual management situations is not acceptable.

Snags

The Eastside Salem SYU's have a serious shortage of snag habitat. Existing population levels at 10% of potential (p. 2-14) in no way represent viable populations of primary excavators. The DEIS states (p. 3-19) that, "(l)eaving an average of four snags or green trees of prescribed sizes per acre in each harvest unit would be necessary to alleviate the existing shortage and achieve a population level of primary excavators that is at least 60% of potential." Does this represent the
102-10 proposed management scheme? If a 10% level currently exists, how can massive additional clearcutting, even with leaving four specified stems per unit, result in achieving a 60% level? The importance of snag management has been drawfed by the timber bias of this document, and it must be more substantially addressed.

Timber

102-11 The EIS should include a discussion of what guidelines will be used for the dispersion of clearcuts, what level of growth will be achieved in a cutting unit before adjacent stands can be cut, and what level of productivity is being used
102-12 to define commercial timber land. Criteria that were used to determine those
102-13 prescriptions should be outlined, and alternative prescriptions should be listed and evaluated for their effect on harvest levels and the ecological, social, and ecomonic costs and benefits.

102-14 The EIS should also include an analysis of the projected longterm productivity of the SYUs, and what the result of liquidating much of the old growth forest will be in terms of the annual harvest.

102-15 The DEIS fails to document the current backlog in reforestation of cutover areas, and therefore inaccurately projects the future production of timber. In addition,
102-16 the evaluation of intensive management techniques does not cover the possibility

102-16 of shortages in funding and energy supplies.

102-17 The EIS should analyze all possible methods of brush control, considering costs, site limitation, equipment limitations, kind and distribution of target plants, potential environmental impacts and potential human and animal health hazards.
102-18 Various methods of maintaining soil productivity other than fertilizers should be analyzed for the above considerations.

Old Growth

The DEIS completely ignores the current research data which outlines the many values and the many unknowns of old growth. This is graphically revealed in the discussion of the spotted owl, which discusses the bird as if it is an isolated species rather than one species of several that are dependent for all or part of their life cycles on the advanced serel stages of an old growth forest.

This limited perspective in regard to old growth is dangerously inaccruate and cannot possibly guide wise management policy. If 350-year rotations are to meet all the needs of old growth-dependent species, then either documentation of how that has worked in the past or data that shows without a doubt that it will work in the future should be included in the EIS. The ecological conditions of an
102-19 old growth forest between 350-800 years of age should be documented in the EIS.

A managed (long rotation) old growth stand will be characteristically different than a natural old growth forest. These differences should he described in the EIS. The final plan should also display the costs and benefits of managing natural old growth stands vis-a-vis long rotations.

102-20 As for the spotted owl, management guidelines are extremely haphazard. Reductions in population levels are accepted without any documentation as to the assumptions, possible error, or safeguard measures proposed that will guarantee viability for the species and other such species which depend on old growth.

Threatened and Endangered Plants

If there's any common demonimator to federal management of threatened or endangered plants, it would have to be carelessness. The study of these plants is relatively new, and care must be taken with management activities that may be impacting critical habitats. Specific guidelines for pre-management activity surveys should be in-
102-21 cluded in the EIS and should specifically outline the required specialists to do the survey, the season in which it will be done, and the process by which it will be conducted.

Gene Pool

The brief discussion of genetic deversity (p. 1-15) outlines a program which is far from comprehensive. 1400 genetic combinations can hardly be termed diversity, since a typical natural gene pool has hundreds of thousands of genetic combinations. Table 1-2 shows 10,049 acres will be planted with genetic experiments in the coming
102-22 decade. Planting roughly 1000 acres per year with such experiments is a significant use of that management scheme. However, nowhere is there a discussion of the scientific data that proves the viability of those experiments over time.

In addition, the EIS lacks a safeguard strategy for the "worst case" possibility that the so-called "super trees" may have serious failures at some time in the future.

Recreation

102-23 The "Affected Environment" portion of the EIS fails to address the use of the Table Rock Roadless Area by horse riding groups. Since the analysis of recreational use--both existing and projected--plays an important role in management decisions, the current and future use of Table Rock by equestrians and pedestrians must be addressed.

The fact that agency specialists did not "do their homework" is no excuse for basing a major land management decision on inadequate dta.

It is stated (p. 3-26) that timber management activities in the preferred alternative will not allow for some of the future recreation needs. This would certainly im-
102-24 pact the hiking/horse riding category. Yet, Table 3-10 states that the preferred alternative will be beneficial to these recreational opportunities. If it fails to meet expected demand then it can hardly be termed beneficial.

Even if it is assumed that hiking/horse riding trails are not adversely impacted by timber harvest activities, primitive recreational opportunities, which you failed to address altogrther, are certainly adversely impacted. Such recreation includes opportunities for solitude, quiet, and escape from the activities of
102-25 human beings. If primitive recreation is supposed to be covered by the "other" classification, then documentation is needed which proves that the existing condition is good and the proposed alternative will maintain that condition.

The claim that the "Caution Zones" of the ACECs are receiving special consideration in timber harvest scheduling is at best simply misleading and at worst an outright lie. It makes no difference if clearcuts are limited to fifteen acres. You simply will have to have more of them. In many cases, the assignment of a 100-year rotation to these lands is allowing harvests with the same frequency as the normal commercial
102-26 timber lands. Even if the standard rotation for this region is 75-80 years, the recreationist will perceive little difference.

Since you went to the trouble of recognizing these Areas of Cricial Environmental Concern, you should prescribe management activities that are significant in their approach to achieve the goals of the area--not simply meaningless gestures.

Wilderness

The DEIS's treatment of wilderness is very inconsistent with the document's treatment of other non-timber resources. Obviously, the "dominant use" (sic) mandate of the O&C Act (Solicitor's Opinion #1) is being used as an excuse not to fully address the wilderness issue for Table Rock. It is interesting to note that the agency did not also ignore the importance of wildlife habitat, since it isn't specifically mentioned in the O&C Act either.

The National Environmental Policy Act requires that you discuss a range of alter-
102-27 natives for the SYU's de facto wilderness. The Act also requires that you document the destruction of wilderness characteristics in the Table Rock and Nasty Rock areas, in the event you do not opt for preservation.

There is substantial support for Wilderness designation for Table Rock among conservationists statewide and among horse riding clubs that use the area extensively. This was certainly shown at the Congressional Field Hearings of the Public Lands and National Parks Subcommittee of the Committee on Interior and Insular Affairs of the US House of Representatives. The Final EIS should provide a summary of the hearing record which particularly pertains to Table Rock. In making the decision not to inventory Table Rock for Wilderness qualities, and in failing to document how proposed activities will destroy Table Rock's wilderness characteristics, the agency is obviously ignoring public involvement in the planning process.

Minerals

The preferred alternative lists 9100 acres that will be examined for possible conflicts between mineral developments and other resource values. All special management areas should be permanently removed from mineral exploration and development. All the lands in the SYUs should be exammined for possible adverse
102-28 impacts of mining on watershed, wildlife habitat, fisheries, recreation, soils and timber management. Those possible impacts should be presented in the EIS.

Soils

Timber supply and projected future harvests often consider long range goals, such as the recommendation in this plan for 350-year rotation on some lands. Soil productivity should also be examined in the long term, considering the
102-29 impacts of sucessive entries into particular sites.

102-30 The DEIS states (page 3-5) that, "(t)he net result, after mitigation, would be an irretrievable loss of soil productivity on approximately 750 acres of land." This is called timber mining and is clearly illegal. If forested lands cannot support successful regeneration, then they should not be cut.

Brush Control

While the DEIS evaluates herbicides in some detail, it does not do a comprehensive summary of brush control techniques. A benefit-cost analysis for all the possible techniques should be done in the EIS, considering, but not limited to,
102-31 manual and mechanical means, herbicides, and the use of alternative harvest techniques (i.e. shelterwood harvesting). In addition, the relative energy consumption of the various techniques should be outlined, as well as the possibility of future budget constraints on intensive management activities.

On page 3-20, the DEIS states that habitat diversity in early serel stages would be adversely impacted by herbicide use. The discussion of habitat diversity as-
102-32 sumes that clearcut areas increase diversity. Obviously herbicides alter that assumption. Their role should be fully examined in the wildlife portion of the EIS.

Monitoring

History has shown that many plans for monitoring various management activities do not materialize because of a lack of funding. This is particularly true for studies of such things as recreational opportunities, cultural resources and endangered plants.

102-33 If the agency is serious about monitoring plans, then an outline of how they will be funded should be included in the EIS. In addition, management activities that will mandate resource monitoring when no funding is available to do that monitoring should be postponed.

Ecosystem Management

While the proposed action does provide a range of habitat forms, it is inaccurate to say that the agency is applying the ecosystem approach to the SYUs. The oldest serel stage represented is only going to be occuring in a 2-4 mile wide corridor. An important characteristic of true ecosystem management is the distribution of the various stages throughout the management area. The corridor approach also presents a significant change in the percentages of ecosystem types--specifically a signficant reduction in the amount of 196+ year forest represented.

102-34 If there is anything absolutely known about old growth forests, it is the fact that we still know very little. One of the greatest unknowns is the ecological development of those forests between the time they begin to exhibit old growth characteristics and the maximum age that their life cycles may achieve.

These advanced stages of growth in such forests are never addressed in the DEIS and there is no plan to ensure that the option of studying them is maintained. This certainly places a serious contraint on future management and is based on the dangerous and inaccurate assumption that everything important is already known.

The agency should demonstrate a more visionary approach to management of these important resources. A true ecosystem approach would ensure that all possible serel stages are represented.

Economics

102-35 The analysis of short-term economic impacts should include the subsidies that the timber industry receives from taxpayers when the agency determines the price of timber through the residual pricing system, and revenues do not cover the cost of implementing the sales or of management of the next crop of trees.

The analysis of long-term economics should include a discussion of economic implications of harvesting all but 9% of the old growth in the next 10 years. In addition, the EIS should do an economic analysis of the impacts to resources such as fisheries, clean watersheds, recreation, wildlife and plant habitats, and wilderness.

Sincerely yours,

James Monteith
Executive Director

JM/np/ak

cc: BLM State Director William Leavell
Senator Mark Hatfield
Senator Bob Packwood
Representative Les AuCoin
Representative Denny Smith
Representative Ron Wyden
Representative Jim Weaver
Governor Victor Atiyeh
National Wildlife Federation
Natural Resources Defense Council
Sierra Club Legal Defense Fund
Cascade Holistic Economic Consultants
The Wilderness Society
Mazamas
Mount Jefferson Group Sierra Club
Oregon Equestrian Trails
Central Cascades Conservation Council
Clackamas County Riding Clubs Association

Response to comments in Letter 102.

102-1 The Council on Environmental Quality regulations 40 CFR 1502.14(a) indicate that an EIS should evaluate only reasonable alternatives. The CEQ has indicated elsewhere that reasonable alternatives include those that are practical or feasible from a technical and economic standpoint and using common sense. They should also meet the objective of the proposal, i.e., provide a permanent source of timber supply as required by the O&C Act. The purpose of the alternatives in an EIS is not simply to provide arbitrary benchmarks for comparison.

102-2 Alternative 7 (no action) assumes no change in 1972 management. Although funding to carry out the 1972 program would be greater today due to inflation, this alternative would provide a management program consistent with historical funding. Tables 1-2 and 1-5 indicate what could be accomplished under Alternative 7.

102-3 BLM is committed to meeting all applicable State water quality standards, including the implementation of best management practices (BMPs) for control of non-point sources of pollution. The Oregon Department of Environmental Quality (DEQ) and Oregon State Department of Forestry (OSDF) reviewed and compared BLM forest management practices and rules in relation to the Oregon Forest Practices Act rules, which have been approved and certified by EPA as BMPs. This evaluation determined that BLM rules and practices are equivalent to the State's BMPs. The Governor then certified BLM as the Water Quality Management Agency for Federal lands under its jurisdiction. As part of the agreement with the State of Oregon, BMPs will be monitored by BLM to meet two objectives. The first is to determine how well prescribed BMPs are being implemented in field operations. This is done routinely as part of BLM timber sale contract administration. The second monitoring objective is related to the effectiveness of prescribed BMPs for meeting instream water quality standards. As funds are available, BMPs will be evaluated to determine whether they are having the desired and expected effect on water quality and to guide decisions on possible modifications.

102-4 See responses to comments 18-4 and 101-1.

The elements cited are addressed in Chapter 3, Impacts on Water Resources and Impacts on Animals, Fish section.

102-5 See response to comment 18-11.

The most important measure for maintaining and enhancing fish habitat would be establishing old-growth conifer buffers to supply a continual source of large woody structure to streams. Additional proposals in the Eastside Salem District Management Framework Plan include revegetation of bare soil areas and use of artificial structures to improve pool/riffle ratios and bank and channel stability.

102-6 See response to comment 101-2.

102-7 See response to comment 18-11 and 102-5.

102-8 On page 1-21 the National Park Service is identified as the administrative agency for the Nationwide Rivers Inventory. BLM's involvement in the inventory is described in several memoranda which may be reviewed in the Salem District office. A document recently issued by the National Park Service, which addresses the second phase of the inventory, does not list any additional rivers within Salem's Eastside Planning Area.

102-9 The text has been revised in Chapter 2, Terrestrial Animals section, and Chapter 3, Impacts on Animals, Terrestrial Animals section. These revisions provide information on acreages of special habitats and anticipated impacts on them.

102-10 Although four snags or green trees per acre would be necessary to alleviate the shortage of snags on previously harvested lands, the snag policy under the new preferred alternative calls for an average of two snags per acre on future harvest units. The attainment of a 60 percent population level of primary excavators on harvested lands would not be achieved. Populations of primary excavators on the no planned harvest and constrained harvest lands would likely be higher than 60 percent but not high enough to make up the deficit on harvested lands.

102-11 See response to comment 10-3.

102-12 Commercial timberlands are those lands capable of yielding at least 20 cubic feet of wood per acre per year of commercial coniferous tree species.

102-13 To achieve adjacent clearcut timing of more than 5-7 years under any alternative, as presently defined, would reduce timber harvest levels and attendant social and economic benefits. Benefits related to big game hunting would increase with more time between harvest of adjacent clearcuts.

102-14 Analysis of cut calculations for the new preferred alternative indicates that the sum of the maximum annual sustainable harvest level for the two SYUs would be approximately 99.1 MM bd. ft./year (40.9 MM bd. ft./year for the Clackamas-Molalla SYU and 58.2 MM bd. ft./year for the Santiam River SYU). At this maximum level of future growth, the forest would be characterized by an even age-class distribution, stabilization of final harvest acreage and final harvest occurring at the culmination of mean annual growth (75 to 80 years).

The level of annual harvest is based upon the age-class distribution of the existing forest in the timber management base and projected growth resulting from the application of certain management practices. Old-growth stands are either producing less net volume than younger stands or are actually suffering net losses of volume per acre each year. By assigning these stands top priority for harvest, they could be harvested before losing additional volume from windthrow, insects and/or disease. Following harvest, these acres would be available for intensive management to improve productivity. The projected long-term productivity discussed above is predicated upon this type of harvest scheduling.

102-15 A reforestation backlog exists of approximately 1,200 harvested acres. These acres were harvested at least 6 years ago and do not contain acceptable numbers of well-spaced trees per acre. The impact of these backlog acres on future timber production was accounted for in determining the "regeneration lag" used in the allowable cut calculation. (Regeneration lag is the average number of years between the sale of timber and the date of successful planting.)

102-16 See Common Issue 1.

102-17 See response to comment 87-3.

102-18 Methods of maintaining soil productivity have been examined and described in the planning/EIS process. Fertilization would be used to improve soil productivity in nitrogen-deficient areas. Use of nitrogen-producing plants is also part of BLM's management proposal.

102-19 Documentation of the effectiveness of 350-year rotations in providing necessary habitat for old-growth species is not available. Such rotations have not been tried anywhere to BLM's knowledge.

The ecological conditions of an old-growth forest between 350 and 800 years of age are described in detail in the Franklin, et al. 1981 publication, Ecological Characteristics of Old-growth Douglas-fir Forests. Old-growth stands managed on long rotations would be similar in structure to natural old-growth stands.

102-20 See response to comment 87-2.

102-21 General guidelines for plant surveys are stated on page 1-10. Specific plans for these surveys must be tailored to individual timber sale plans.

102-22 The genetic tree improvement program for the Eastside Salem SYUs is designed to increase the quality and quantity of future timber production in the long term. The basic components of this program include the following:

1. Tree Selection in Natural Stands. Inevitably, the selection process will reduce the gene pool to some extent. The proportion of the gene pool affected will be very small, however, because selecting a large number of parent trees widely scattered throughout each breeding zone will assure retention of a broad genetic base. Such a selection process will assure greater genetic diversity than the process currently used to provide reforestation seed. The gene pool will actually be broadened through the breeding of trees that would otherwise be unable to cross pollinate due to physical separation in the wild. BLM is confident that this selection process and subsequent testing will produce seedlings free of genetic imperfection, thus eliminating the possibility of serious failures in the future.

2. Establishment of Genetic Test Plantations. Seedlings from wind-pollinated seed collected from each selected tree in the tree improvement program will be planted in test plantations. This should allow testing under a wide range of environmental conditions and selection of trees for broad adaptability. Continued progeny testing in the second and subsequent generations will preserve pedigreed families under a variety of environments.

3. Production Seed Orchards. Seed orchards are designed to produce improved reforestation seed that is highly stable in performance throughout a range of environments. The stability of this seed results from the selection and testing process and from crossing unrelated families in the seed orchard. Seed orchards will be established for each breeding zone, and seeds from the orchard will be used in the same zone. Since only native species and sources within a breeding zone will be used, no major maladaptations are expected.

4. Long-Term Breeding Population in Clone Bank. In each tree improvement cycle (generation), breeding and seed production populations will be kept separate. This will allow the maintenance of more genetic diversity in the breeding population. Approximately 900 initially-selected trees will be preserved in the clone bank (the statement in the draft EIS that 1,400 genetic combinations would be preserved is incorrect). Additionally, various acreages of natural stands would be withdrawn from timber production under all alternatives. Under the new preferred alternative, approximately 26,500 acres of fragile sites, scenic areas, riparian buffers, recreation sites and other lands would be withdrawn from timber harvest. These areas would be beneficial in conserving the natural gene pool.

5. Cooperative Tree Improvement Program. The Bureau is a member of the progressive tree improvement cooperative. The cooperative includes 32 private landowners, 3 Federal agencies, 2 states, 2 counties and 1 university; and serves almost 7.5 million acres of commercial forest lands in Oregon and Washington. Through this cooperative program, BLM is able to draw on a much larger number of potential selections for its breeding and production populations.

6. Tree Improvement as an Intensive Forest Management Tool. Tree improvement is an operational program. The tree improvement plan has been designed to be as flexible as practicable. As new tree improvement technologies are developed, including refined or new techniques of gene pool conservation, they can be incorporated into the plan with minimal disruption to ongoing programs. If inbreeding problems arose, the genetic base could be enhanced by making new selections from natural stand reservoirs within the zone, incorporating new selections from adjacent zones, or generating new gene combinations by crossing trees from adjacent zones.

Genetic variability is a prerequisite to improvement in plant populations. In forest trees, it is stored in locally adapted indigenous populations. The total phenotypic variation (see Glossary) in a species can be partitioned into genetic and environmental levels which are commonly geographic and elevational levels, stands within locations, and trees within stands. This enables geneticists to determine where to concentrate selection efforts for the greatest response and to predict what the response should be. Genetic variation in Douglas-fir has been summarized in Silen (1978).

Genetic gains from Douglas-fir progeny tests are summarized below:

Trait	Gain (%)	Age (years)	Reference
Height	0 to 34	5	Ching (1965)
Height	137 to 146	1	Bialobok & Mejnartowizc (1970)
Height	9	5	Illingsworth & St. Pierre (1975)
Volume	9 to 30	13	Wilcox (1974)
Height	15	53	Namkoong et al. (1972)
Height	0 to 61	9	Rowe & Ching (1973)
Height	395	2	Thulin (1963)

In the cooperative tree improvement program, the 10-year progeny test data indicated that the top 20 percent of the families showed gains in height ranging from 7 to 8 percent, and gains in volume ranging from 15 to 22 percent (these data are available from Tree Improvement News Letter published by Industrial Forestry Association).

To maintain the adaptability of Douglas-fir populations, a number of breeding units are identified in an area. Since only native species and populations within the breeding unit are used in reforestation, no major maladaptations are expected. Recently, Adams (1981) reported that Douglas-fir seeds produced from seed orchards are not appreciably less variable than seeds from natural populations in the same breeding zones, and certainly would be as variable as seeds from commercial collections or seed trees. He further concluded that tree improvement efforts may lead to a broader genetic base in plantations than that occurring with present regeneration, at least in the earlier generations of breeding programs.

Genetic variability in a selected population influences the probability of catastrophic pest epidemics; the number of trees in a population has relatively little influence on this. The main issue is how much genetic variability should be present in a population to minimize the probability of a pest epidemic. In quantitative traits, the number of different genotypes (see Glossary) that can be generated through recombination is extremely large. For example, if a trait is influenced by 100 segregating loci with two alleles (see Glossary) per locus, 5.5 x 10^{47} different genotypes can be generated. In quantitative traits, an extremely large breeding base population can be created from a relatively small number of individuals which show some genetic diversity. It is reasonable to assume that there is ample quantitative genetic variability in breeding populations and that this trend will continue indefinitely.

102-23 See response to comment 45-1.

102-24 The statement on page 3-26 of the draft EIS refers to future needs for developed recreation sites (ie., campgrounds and picnic areas). Construction of two new trails and better management of existing trails are included under the new preferred alternative. Therefore, the rating for hiking/horse riding is positive.

102-25 "Other" includes many activities in addition to primitive recreation. The only area which would offer a primitive recreation experience (as defined in this comment) is the Table Rock area. During the planning process, various recreation management proposals for Table Rock were analyzed, including unroaded recreation (equivalent to primitive area management). The value of Table Rock as an unroaded recreation area is described on page 2-18. Impacts on the area are presented on page 3-29.

102-26 See response to comment 40-1 for an explanation of ACEC management proposals.

Limiting some clearcuts in the potential Table Rock ACEC to 15 acres is proposed to avoid visual impacts that would occur from clearcutting larger areas. Several small clearcuts in this area would be less visually intrusive than fewer large clearcuts. The timber harvest restriction of 10 percent removal per decade within the caution zones of three potential ACECs was designed to mitigate impacts on primary zone values. The Table Rock area, in particular, would be harvested more heavily (i.e., approximately 18 percent removal per decade) without this constraint.

102-27 Limitations on wilderness review and designation are discussed on page 2-23. For a discussion of unroaded recreation values in the Table Rock area, see response to comment 102-25. Under the new preferred alternative, the Nasty Rock area would be withdrawn from the timber base to protect wildlife values.

102-28 The subject of this EIS is timber management. Discussion of mineral development impacts is beyond its scope.

102-29 The productivity losses shown in Tables 1-5 and 3-1 represent expected losses for the next decade. Many of these losses, such as those resulting from road construction, would not be duplicated in following decades. Losses due to nitrogen depletion are cumulative, however, and would occur each time a site is harvested. Researchers have determined that very little nitrogen is introduced naturally to a site from external sources. Most nitrogen in a site becomes available for use through recycling. Any removal of nitrogen, either by harvesting timber or burning, would reduce nitrogen levels in the long term, resulting in reduced productivity. Soils inherently low in nitrogen would suffer productivity losses with much less impact than would soils richer in nitrogen. Fertilizer, at amounts normally applied, would replenish some nitrogen in the soil, but not enough to replace losses from timber harvesting and site preparation. Furthermore, BLM fertilizes only with nitrogen; other nutrient losses are not offset in the long term.

102-30 Most of the losses represent land that would be taken out of production for use as roads. The balance would result from compaction and soil removal by management practices which are necessary to meet harvest commitments with present technology. The losses would be widely scattered, and sites where they would occur cannot be predicted.

102-31 See response to comment 87-3.

102-32 Herbicides would adversely affect habitat within treatment areas by suppressing or killing forage required by deer and elk, and by reducing nesting cover of songbirds. However, big game forage and shrubby nesting cover for birds are not in short supply in the EIS area at present nor are they expected to be in the future.

102-33 Funds for implementing monitoring plans will be requested through the Bureau's budgeting process. If additional funds are not allocated, plan implementation would be monitored to the extent possible with available funds and personnel.

102-34 In addition to corridors designated for older forest management, old-growth forest would be maintained in fragile, riparian, recreation, and natural areas under the original proposed action and new preferred alternative.

102-35 Timber from the lands involved is sold almost entirely by competitive bids considered to represent fair market prices. Although sales administration and reproduction costs are not specifically calculated for each sale, they are generally a small portion of the sale price. Revenues from timber sales have averaged four to five times as much as the total costs involved.

The economic implications of cutting most of the old growth are not well defined. Old-growth stands lose volume and may lose value as timber over time, but non-timber values which may increase as old growth becomes more scarce have not been fully quantified in economic terms.

Impacts have been analyzed for the identified economic values, such as income and employment generated by fisheries, hunting and other recreation.

103

984 Lincoln
Eugene, Ore. 97401
March 23, 1982

Salem District Manager
Attention: EIS Team Leader
Bureau of Land Management
P.O. Box 3227
Salem, Ore. 97302

Dear Sirs:

These are my comments on the Draft EIS for Eastside Salem. I am pleased to see the District adopt a version of ecosystem management for the eastside. Only if all BLM Districts adopt this approach is there any real hope that necessary old growth habitat will be preserved. There are several problems with the alternative, however.

First, the EIS favors the use of mortality salvage on forest lands in the Sustained Yield Units (SYU's). Dead and down timber is the essence of old growth forest. Without it, the entire structure of an old growth forest is gravely compromised. Allowing mortality salvage in the old growth blocks 103-1 negates, to a great extent, the purpose of creating them in the first place.

Second, the riparian zones are an integral part of any corridor scheme because they connect old growth patches, and also have the greatest diversity of wildlife. They are also, of course, critical to fish habitat. The EIS states, on page 1-4, that third order and larger--and some second order--streams will be protected. It is important to protect the smallest head streams. It is there, rather than on the larger streams, that water quality is retained or lost. If logging scars the intermittent trickles high in the hills, it will do no good to protect the larger streams below. The alternative must propose workable ways of protecting the smaller streams.

The spatial component is insufficient. A most important underpinning of habitat diversity is the spatial placement of the different forest seral stages. Waiting 5-7 years "when possible" before harvesting next to a clearcut is a useless constraint. First of all, few clearcuts are replanted by that time. Five years is the maximum time allowed for replanting a unit. No vegetation will have grown up by then. Certainly there will not be sufficient growth to greatly 103-2 differentiate the older from the newer clearcut for wildlife. The idea behind ecosystem management is diversity. Simply having an island of old growth amongst a sea of clearcuts is not, by any definition, diversity. Diversity requires that the landscape be a mosaic of different age classes. This milktoast spatial standard simply does not do the trick. Of course, it would cause difficulties in scheduling timber sales to apply a more rigid spatial requirement, but the ultimate price is small.

Page 1-7 notes that wildlife values associated with uniqu and special habitats would be given full or partial protection, as dictated by individual management situations. That is a vague phrase if ever there was one. The 103-3 District must have a concrete policy for making those decisions. Otherwise, the decision is likely to be arbitrary and unorganized. The purpose of the EIS is to spell out decision criteria. So where are they for this particular problem?

The EIS further notes on the same page that portions of ACECs would be harvested at a rate of 10% per decade. The reason for ACECs is to protect them 103-4 because of unique and special values. All of the ones listed for eastside Salem are the sort listed precisely to protect them. They are not listed because they are dangerous to life and property. Removing timber, even at such a low 103-4 rate, is incompatible with the designation.

The section beginning on page 1-10, Forest Management Treatments, is very shallow. The BLM knows well there is great controversy over various aspects of current forest management. Yet no real explanation of that is given. Worse, there is no substantive effort to deal with the questions. Many of these questions have come from within the agency itself. The original Young Growth Management Committee Reports disavowed mortality salvage, agreeing that many old growth stands had been butchered for a few more trees. These same reports 103-5 wished to maintain fertilization only as an occasional tool in forest management. However, the EIS embraces it wholeheartedly. The YGMC reports also decided against precommercial thinning of natural stands. The EIS makes no such distinction. Individual staff members' questions about the gains assigned genetic improvement and the efficacy of fertilization and precommercial thinning echo concerns by the public. The EIS addresses none of them. The EIS does not explain, or attempt to justify, the questionable practice of "piggybacking," that is, making forest management effects cumulative.

The EIS accurately identifies the effects of its preferred alternative on wildlife and vegetation structure, especially the loss of old growth forest. The BLM has a crucial role to play in preserving old growth in the badly cutover foothills of the Cascades. But the preferred alternative is not a viable policy for that purpose. Nor is it a prudent policy for avoiding the punishments of the Endangered Species Act. The U.S. Fish and Wildlife Service prefers a preventive policy towards species management, hoping thereby to avoid serious management constraints to protect threatened and endangered species. Assuming that some old growth species will not survive without abundant acreage in that seral stage, the BLM's plan does not provide a preventive margin. This is a very serious problem. Table 3-6 predicts the decline of old growth under the preferred alternative.

In sum, let us remember that there are fundamental changes occurring in the wood products industry. Mills are closing because of a national demand problem, not a supply problem. Millions, if not billions, of board feet of old growth timber are sold and uncut on BLM lands in western Oregon. Mills are automating, leading to a change in employment structure that has little to do with timber supply availability. The BLM has a duty to protect those resources which private landowners would not protect. The job is not being well done, although the progress is tremendous.

Sincerely,

Cameron La Follette

Response to comments in Letter 103.

103-1 Natural stand development would be allowed within old-growth blocks retained for wildlife (see page D-2). The new preferred alternative would allow mortality salvage only in the event of major catastrophies.

103-2 A 5- to 7-year constraint on clearcut spacing would not provide the best habitat diversity. However, this spatial constraint would apply only to the intensive timber production base where the primary objective is to produce the maximum sustainable even-flow harvest level. In the constrained timber production base, lands would be managed for the conservation of non-timber values (e.g., ACECs, scenic corridors and wildlife habitat). Less intensive management, including such practices as 10 percent removal per decade and long rotations, would result in a reduced annual harvest level for these lands. This, in turn, would reduce acres harvested. Although no harvest schedules were developed to determine the spatial distribution for clearcuts in the constrained base, a 10-year constraint on harvesting adjacent units is anticipated.

With regard to the time lag in planting recently harvested units, the data used in calculating the "regeneration lag" period (the average time between the date of sale and the date of successful planting) for the allowable cut was reviewed. This review indicated that for the units surveyed, the average time between harvest and date of successful planting was 3 years. Five years after harvest, planted seedlings ranged from 2 to 2½ feet tall.

103-3 Salem District policy with regard to unique and special wildlife habitats involves environmental analysis of projects which may affect these areas and decisions to trade-off one or more values if conflicts cannot be avoided. Impacts on specific habitat areas will be addressed in site-specific environmental assessments.

103-4 See responses to comments 40-1 and 102-26.

103-5 Differences of opinion regarding various intensive management practices do exist among district personnel. These opinions are part of the record contained in the Young Growth Management Committee (YGMC) Reports. These reports were prepared in 1978 at the beginning of the planning - allowable cut determination process in an attempt to identify intensive practices which could be applied in the future. Using the most current information available, the committee recommended 21 practices for District Manager decision. Following are responses to your comments regarding specific practices:

1. Mortality Salvage. The district has been conducting a salvage program since 1952. The mortality salvage harvest commitments over those 30 years have resulted in some questionable management practices. Damage has occurred to reserve timber, soils and water resources. Additionally, the mortality salvage program has been in direct conflict with snag retention for wildlife.

   The mortality salvage program proposed for the coming decade is designed to avoid most problems experienced in the past and is based upon inventory plots containing more than 3,000 bd. ft/acre of dead and high risk (expected to die within 10 years) volume. These plots were examined by district foresters to select only those where timber could be removed using existing road systems or short spur roads, where entry for final harvest would not be scheduled for at least 10 years, where topography would be suitable for partial cut logging operations, and where salvage volume would not be sufficiently large or widespread to make clearcutting more appropriate. The 1,113 acres of mortality salvage identified under the new preferred alternative would be examined for opportunities to retain snags for wildlife.

2. Fertilization. See response to comment 97-9.

3. Precommercial Thinning. The YGMC report on precommercial thinning excluded this treatment in natural stands, and so does the new preferred alternative. The recommended age for treatment is 10 to 20 years of age, and natural stands of these ages are not expected to exist.

4. Genetic Tree Improvement. The YGMC report anticipated a genetic gain of 5 percent for all acres planted with improved seedlings during the first decade, 10 percent during the second decade and 20 percent during the third decade and beyond. After further examination of the program, a decision was made to restructure the genetic gain phase-in to make it coincide with anticipated progeny testing results. The phase-in projects a 3 percent gain for those acres planted with improved seedlings during the first and second decades, 6 percent during the third decade, 11 percent during the fourth decade and 16 percent during the fifth decade and beyond.

The concept of "piggybacking" intensive practices is controversial. This controversy stems from a lack of research on the cumulative effects of applying various combinations of intensive practices to stands of varying site quality over the length of a harvest rotation.

Although long-term research is lacking, research of shorter duration has produced much data. The authors of DFIT feel that data from short-term research can be safely extrapolated into the future. (DFIT is the managed Douglas-fir stand yield simulation model developed at the USFS Pacific Northwest Forest and Range Experiment Station to project future growth under various intensive management schemes.) In developing the DFIT model, the best available information was used to simulate the combined effects of intensive practices. BLM has adopted DFIT, with certain adjustments, as an acceptable estimator of future managed stand yields. This information will be used to implement a program on lands suitable for intensive management.

The two Eastside SYUs will be reinventoried within 10 years, and new allowable cut projections will be made with the best information available at that time. This scheduled reevaluation provides a "safety valve" for the process. Additionally, the allowable cut effect credit taken for the SYUs establishes current harvest levels based upon a 32 percent reduction in the full potential level of future growth attributed to intensive management (see Allowable Cut Effect section in Appendix B). Such under-utilization, translating into a reduced harvest, will result from basing harvest levels upon the current level of standing volume available for harvest. This will largely negate the questionable aspects of "piggybacking."

410

INDUSTRIAL FORESTRY ASSOCIATION

225 S.W. BROADWAY / RM. 400
PORTLAND, OREGON 97205

Telephone
(503) 222-9505

April 14, 1982

Mr. Joseph Dose
District Manager
Bureau of Land Management
P.O. Box 3227
Salem, OR 97302

SUBJECT: Eastside Salem Draft Timber Management
Environmental Impact Statement

Dear Mr. Dose:

First, let me thank you for the additional time you have allowed us to respond to the above subject.

IFA has been active on BLM's planning process on all the Western Oregon BLM Districts since the new planning process began. It has been a long, complicated and expensive process and we are glad to see you shorten this process by eliminating the Draft Decision Document. We would ask that you show in the Final Environmental Impact Statement (FEIS) a brief summary of public input to the alternative shown in the Draft Environmental Statement and what changes were made in the FEIS to accommodate the public concerns. Our comments will fall into three major categories.

LAND BASE

410-1 IFA requests that a different format be used for displaying the various land allocations by alternatives. An example is attached for your consideration. We think it is a clear and concise summary that is easily understood.

410-2 We suggest that the land base in your Alternative #1 needs to be corrected and re-analyzed to show the fragile sites and reforestation problem areas as withdrawn. You have identified these withdrawal areas in the TPCC inventory as unsuitable for timber management. If they are valid withdrawals for other alternatives then they are valid withdrawals for Alternative #1. This alternative would then be the maximum timber harvest alternative and be presented utilizing our format as follows:

ALTERNATIVE 1

Total Acres - Planning Area	159,898
Less Withdrawals	21
Non-forest	11,695
Fragile sites	10,958
Reforestation	953
Subtotal	23,606 acres
Less Management Withdrawals	
Visual resource	0
Recreation sites/lands	734
Riparian zones	0
Wildlife habitat area	0
Miscellaneous (natural, cultural)	155
Subtotal	889 acres
Timber Land Base - Total Acres	130,247 acres
Less Acres Constrained	
Areas critical environmental concern	0
Visual resource	0
Wildlife habitat	0
Riparian zones	0
Municipal watersheds	0
Recreation education areas	0
Subtotal	0
Timberland for Timber Harvest and Management	130,247 acres
Plus hardwood conversions	435
Total Timberland for Timber Harvest & Management	130,682 acres
Annual Harvest	110 MMBF

An analysis of the maximum even flow level was completed on this land base with
the results being an annual harvest level 21 percent higher than the proposed
action at 110 MMBF/yr. It is most important that withdrawals from the timberland
base be totally justified if they cannot be mitigated. For instance, take the
410-3 increase of 4,381 acres above the current 1,139 acres in the riparian zone land
withdrawals. What factual experience is there that this increase is needed and
what other mitigating actions could be used to reduce timber values foregone,
other than simply eliminating the acres from the base. Also, in the acres of
constrained harvest the same justification and analysis must be present in the FEIS.

410-3 Why is it necessary that the constrained visual acres reduce opportunities to optimize timber production. What evidence is there that says the public does not expect to see timber managed intensively?

Industrial Forestry Association has always supported intensive forest management
to increase yields, jobs and community stability, to protect watersheds, recrea-
tion and all aspects mentioned in the O & C Act. We do not support the spending
of intensive management dollars to maintain status quo forest yields to compensate
for non-justified withdrawn or constrained commercial forest land or for other uses;
i.e., ACEC's and visual management. The values foregone from resource development
to the public are much too great. It is imperative that the cost efficiency of
410-4 each alternative be considered in the FEIS and not wait to display it in the decis-
ion document.

ECONOMIC ANALYSIS

After reviewing your economic efficiency study for the Eastside Salem District DEIS we find it raises serious questions. The analysis is based solely upon the allowable cut effect which has been discredited by OMB, academia and the industry.

Economic analysis should consider all of the costs of producing a future crop of trees, i.e., reforestation, PCT, CT, fertilization and final harvest, with the benefits (stumpage value, recreation fees) and costs properly discounted to the present. The financial returns of investments should be when the stand is finally harvested and the analysis should also consider that there is a "holding cost" of the existing inventory.

Your economic analysis calculates the benefits and costs of only the plan decade and assumes investments made today, pay off today. This is the allowable cut effect. Not only must one evaluate the correct time stream of investments and benefits, but one must also evaluate the costs of maintaining excessive inventories, i.e., a "warehousing" charge if you will. The economics literature is full of examples of incorrect decisions based on ignoring the costs of inventory. Additionally, often benefit cost ratios represent a biased measure of economic worth. There is a large body of economic literature that demonstrates conclusively that only the net present value analysis consistently ranks alternatives correctly in terms of economic desirability.

Our calculations show significant differences from your analysis. Using the BLM's values and costs, financial results are compared below:

	Benefit/Cost Ratios							$MM
	BLM			IFA				PNV
	4%	7 5/8%	10%	4%	7 5/8%	10%	IRR	4%
PA	9.1	9.0	9.0	2.3	.39	.079	5.46	5.0
Alt. #1	9.4	9.4	9.4	2.4	.40	.083	5.54	6.7
Alt. #4	8.4	8.4	8.4	2.2	.37	.076	5.38	3.4
Alt. #1 Mod.*	-	-	-	2.8	.47	.097	5.81	6.9

*Max. Evenflow on 130M acres

These figures are based on the cost data given in the report, which does not include all costs or investments required to receiving benefits. Specifically, road and logging costs, when included as costs of producing a return, significantly lowers the economic viability of any alternative. Only our Alt. #1 modified (evenflow on 130M ac.) shows a positive return:

	B/C w/all costs				$MM
					PNV
	4%	7 5/8%	10%	IRR	4%
PA	.87	.14	.030	3.76	-1.2
Alt. #1	.92	.15	.032	3.87	- .9
Alt. #4	.85	.14	.029	3.74	-1.0
Alt. #1 Mod.	1.06	.17	.036	4.10	+ .6

You will note that BLM's alternatives return less than 4 percent on every dollar invested, with costs and prices appreciating at a real rate. To account for costs with inflation, the returns would be significantly less.

Up to this point, costs of holding excessive inventory have been excluded. If the alternative rate of return was 4 percent (government borrowing is now over 13 percent) the BLM must cover (on existing value of inventory) over 70 million dollars in interest charges annually. Put alternatively, with current annual timber receipts of about 33 million dollars, the BLM is making less than 1 percent on its inventory. BLM could significantly reduce its costs of inventory by increasing the allowable cut through departures. The BLM should minimize its inventory costs by reducing the volume of stands not growing at the Government discount rate (7 5/8%).

The costs of maintaining large inventories must be considered in any business or government endeavor. The Government Accounting Office (GAO) minimizes its inventory costs by maintaining neither too little nor too much of any item. Any corporation pays dearly if inventories are excessive, through loans to cover idle inventories or through costs of excessive warehouse space. The BLM must consider costs of its inventory if not in terms of the current cost of capital to the government (13+%) than at least a long-term minimum real cost of capital rate (i.e., 4%). By not reducing inventories to proper level, the BLM unintentionally is extracting monopolistic prices from the purchasers of BLM stumpage.

DEPARTURES

One clear way for society to be better off would be for the BLM to eliminate excessive inventory through temporary departures from non-declining evenflow. In this manner consumer prices for lumber and wood products, as well as overall economic efficiency, would be benefited.

IFA supports departure from long-range sustained yield which is necessary for the BLM to be consistent with the goals and direction of the State Department of Forestry Program for Oregon. This means maintaining a maximum commercial forest land base that will provide for community stability.

410-5 IFA requests that specific departure runs be made and analyzed in the FEIS. Some of these computer runs have already been made. Specifically, on the land base discussed at the beginning of this letter (max land base less TPCC withdrawals (130,682 ac.), we propose three harvest flows. Anticipated results and comparison with the proposed action are shown below:

---

1. Maximize evenflow

Clackamas-Molalla SYU	46.9 MMBF/yr	
Santiam SYU	63.6 MMBF/yr	
	110.5 (+21% of P.A.)	(Alt. #1 Modified)

2. Accelerate for one decade, then evenflow

	1st	2nd
Clackamas-Molalla SYU	59.6	46.9
Santiam SYU	63.6	63.6
	123.2(+35%)	110.5(+21%)

3. Accelerate for one decade, 5% decline for two decades then evenflow

	1st	2nd	3rd	4th
Clackamas-Molalla SYU	64.3	44.6	44.6	46.9
Santiam	71.5	60.4	60.4	63.6
	135.8(+49%)	105.0(+16%)	105.0(+16%)	110.5(+21%)

We would like to see these departure alternatives fully evaluated economically as well in the FEIS. We also support applying the departure concept to the other alternatives as well. We fully support Departure #3 above--accelerate with a 5% 2-decade declining flow and then increasing to the evenflow level.

IFA is concerned that the BLM's strict adherence to non-declining evenflow does not meet the needs of the people of Oregon. Additionally, reducing the commercial forest land base based on questionable assumptions about perceived social and wildlife habitat needs is not a viable package. All perceived needs for habitat, visuals, etc. can be met through varied scheduling or harvest patterning over time and through site specific best management practices. There is little excuse for the BLM to simply remove these acres from the land base when other options have not been explored. Our analysis shows explicitly the costs of removing those acres.

We appreciate the opportunity to comment on the Eastside Salem DEIS and request our comments be given serious consideration.

Sincerely,

R. T. Bailey

Richard T. Bailey
Director of Planning &
Special Projects

Philo Gregg
District Forester

RTB:lf
cc: William G. Leavell
Gerald Gruber

Response to comments in Letter 410.

410-1 The format for displaying acres was established in previous timber management EISs. A change in format at this time would complicate the task of comparing SYUs.

410-2 Alternative 1 has been redefined to exclude TPCC withdrawn lands from the timber production base and to include a departure from even flow. See Chapter 1, Alternatives section.

410-3 The factual base and justification for all management proposals are recorded in planning documents available for review in the Salem District Office.

410-4 An economic efficiency analysis is included in this final EIS as Appendix N.

410-5 Alternative 1 has been redefined to exclude TPCC withdrawn lands from the timber production base and to include a departure from even flow. See Chapter 1, Alternatives section.

Additional variations of Alternative 1 are considered to be beyond the reasonable array of alternatives.

April 19, 1982

Alford Road
Great Barrington,
MA 01230

Bob Saunders
EIS Team Leader
Bureau of Land Management
Salem District Office
P. O. Box 3277
Salem, Oregon 97320

Dear Mr. Saunders,

We were very impressed with the fine work you and your team did on the Draft Eastside Salem Timber Management Environmental Impact Statement. The statement was carefully worded, and the vocabulary was easily understandible. We would also like to commend you on the fact that there were so many alternatives considered in great depth, along with the proposed action. The maps of the areas affected by the proposed action and the alternatives were also very well done. However, there were several problems with the impact statement that we found that you should consider when making your final decision on the Eastside Salem Company's proposed timber management plan.

413-1 The section concerning fish, other wildlife, and vegitation (Section 2-9 to 2-15) was very detailed and easily understandible. Many individual impacts were examined carefully, however, there was no consideration given to the impact on the total ecosystem as a whole. For example, possible reprecussions from impacts on entire food chains, and synergistic effects on the total forest ecosystem should be examined. There were other possible effects that should have been considered more thoroughly. To use another example, according to the statement, impacts on vegetation may be very severe and long term; with widespread microsystem changes in structure and diversity, but this raises questions about the possible changes in food chains, which in turn could shift and imbalance animal population relationships. We feel you should address these issues in more detail.

The section of the statement describing the impacts of herbicides on human health (3-39 to 3-41) mentions that dichlorodibenzo-p-dioxin has been found in small amounts in 413-2 the herbicide 2,4-D. Yet no mention is made of the fact that DCDD has been identified in Toroon 101 (picloram-2,4-D), by Canadian researchers and has subsequently been banned in Canada. We urge you to consider this fact when making decisions about herbicides for possible use in the area.

Another problem with the proposed timber management plan is the predominant harvesting method used when cutting trees within the sustained yeild units. Clear cutting is the easiest and most economical method of harvesting, but it causes severe problems when employed along ridge terrain bordering U. S. Forest Service lands. Land which remains forested along the ridge receives high winds from the areas along the ridge that have been deforested and some of the trees are blown down. This problem is compounded by the fact that the ridge areas are very fragile in terms of reforestation and are usually very difficult to replant with new trees. In the past, timber companies have cut right to the ridges bordering the U. S. Forest Service lands and blowdown has been a problem. This action should be avoided in the future.

Finally, with the timber industry's present economic situation, we question the need for increased timber production under the proposed timber management plan. At present the demand for timber is very low. There is a glut in the wood production industries in Colorado, for example. Any increases in employment and area prosperity will be short lived, and once ended, may only create an economic recession that is worse than the one in the area at this time. In the light of these economic factors, we feel that increased timber production should be delayed until there is a definite need for it, and at this point in time emphasis should be placed on the non-timber aspects within the management plan, such as protection of wildlife habitat, recreation areas, and water resourses.

We hope that these comments and suggestions will be of some aid to you when making your decisions on the proposed timber management plan for the area.

Sincerely,

Seth A. Sladek

Seth A. Sladek
Paul Gwyn
Peggy Clark
Nicole Kehoe

Response to comments in Letter 413.

413-1 Research on total forest ecosystem impacts is limited. The EIS addresses this issue to the extent possible given limited research findings. Under Alternative 8, 21,200 acres of relatively undisturbed forest will be protected and available for research on ecosystem processes. BLM is funding part of a research project involving older forest ecosystems to determine their value as wildlife habitat and as forest gene pools.

413-2 See response to comment 87-3.

The fact that picloram is a restricted-use chemical is incorrectly interpreted by some people as an indication of dangers to humans resulting from its use. Picloram is exceedingly toxic to crop plants, and a restricted label limits its use to licensed applicators who are expected to be able to protect non-target crops.

LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE STATEMENT WERE SENT

LIST OF PREPARERS

LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

Comments on the draft environmental statement were requested from the following:

Federal Agencies

- Advisory Council on Historic Preservation
- Department of Agriculture
  - Forest Service
  - Pacific Northwest Forest and Range Experiment Station
  - Soil Conservation Service
- Department of Commerce
  - National Marine Fisheries Service
- Department of Defense
  - U.S. Army Corps of Engineers
- Department of Energy
  - Region X
- Department of the Interior
  - Fish and Wildlife Service
  - Geological Survey
  - National Park Service
  - Bureau of Mines
  - Bureau of Reclamation
- Small Business Administration
- Environmental Protection Agency

State and Local Government

- Oregon State Clearinghouse
- Oregon Regional Clearinghouses
  - Metropolitan Service District
  - Mid-Willamette Valley Council of Governments
  - District 4 Council of Governments
- Oregon State Historic Preservation Officer
- Boards of County Commissioners
  - Clackamas County
  - Marion County
  - Multnomah County
  - Linn County

Interest Groups (partial listing)

- American Forest Institute
- Associated Oregon Industries
- Associated Oregon Loggers, Inc.
- Association of O&C Counties
- Cascade Holistic Economic Consultants
- Defenders of Wildlife
- Friends of the Earth
- Industrial Forestry Association
- Izaak Walton League
- Native Plant Society of Oregon
- Natural Resource Defense Council
- National Wildlife Federation
- Northwest Environmental Defense Center
- Northwest Timber Association
- Oregon Environmental Council
- Oregon Natural Heritage Program
- Oregon Student Public Interest Research Group
- Oregon Wilderness Coalition
- Sierra Club
- The Wilderness Society
- Western Forest Industries Association
- Wildlife Management Institute

Copies of the final EIS or a summary will be sent to each person, organization or agency commenting on or receiving copies of the draft document.

Copies of this final environmental impact statement will be available for public inspection at the following BLM offices:

Office of Public Affairs
18th and C Streets
Washington, D.C. 20240
Phone (202) 343-5717

Salem District Office
1717 Fabry Road S.E.
Salem, Oregon 97302
Phone (503) 399-5634

Oregon State Office, Public Affairs Staff
729 N.E. Oregon Street
P.O. Box 2965
Portland, OR 97208
Phone (503) 231-6277

Reading copies will be placed in the following libraries: Portland State University, Portland; Oregon State University, Corvallis; University of Oregon, Eugene; Mt. Hood Community College, Gresham; Clackamas Community College, Oregon City; Chemeketa Community College, Salem; Linn-Benton Community College, Albany; and city/county libraries in Portland, Oregon City, Salem, Albany and Lebanon.

LIST OF PREPARERS

While individuals have primary responsibility for preparing sections of an EIS, the document is an interdisciplinary team effort. In addition, internal review of the document occurs throughout preparation. Specialists at the District, State Office and Washington Office levels of the Bureau review the analysis and supply information. Contributions by individual preparers may be subject to revision by other BLM specialists and by management during the internal review process.

Name	Primary Responsibility	Discipline	Related Federal Government Experience
Robert L. Alward	Recreation, ACECs, Wilderness	Outdoor Recreation Planning	4 years National Park Service (Interpretation and Resource Protection Ranger) 6 years BLM (Outdoor Recreation Planner)
Richard Bonn	Human Health	Biology	11½ years SCS (Biologist, Soil Conservationist) 5 years BLM (Environmental Specialist)
John T. Booth	Socioeconomics	Economics	7½ years Corps of Engineers (Regional Economist) 4 years BLM (Regional Economist)
James L. Fogg	Water Resources	Hydrology	1 year U.S. Forest Service (Hydrologist) 4½ years BLM (Hydrologist)
Robert B. Hershey	Description of the Proposed Action and Alternatives, Energy	Forest Management	13 years BLM (Forester)
Robert House	Fish	Fish Biology	7 years USFWS (Fishery Biologist) 5 years BLM (Fishery Biologist)
Ray Mobley	Visual Resources	Landscape Architecture	5 years BLM (Landscape Architect, Visual Resources Specialist)
Roger W. Monthey	Wildlife Biology	Wildlife Biology	½ year U.S. Forest Service & U.S. Fish and Wildlife Service (Wildlife Biologist) 4 years BLM (Wildlife Biologist)
William E. Power	Soils	Soil Science	12 years SCS (Soil Scientist) 13 years BLM (Soil Scientist)
Robert D. Saunders, Jr.	Team Leader, Air Quality, Climate, Geology	Land Use Planning	16 years BLM (Outdoor Recreation Planner, Planning and Environmental Coordinator)
Larry R. Scofield	Vegetation, ACECs	Botany	7 years BLM (Wildlife Biologist, Botanist)
Gary D. Stumpf	Writer-Editor, Cultural Resources	Archeology	1 year U.S. Forest Service (Archeologist) 5 years BLM (Archeologist)

APPENDICES

APPENDICES

A O&C Forest Resources Policy Statement

B Development of Alternatives

C The Scoping Process

D Ecosystem Management

E Wildlife Species & Habitat Use

F Alteration of Wildlife Habitat

G Soils of the SYUs

H Sensitive Plant Species Currently Under Review for Possible Listing

I Primary Criteria for Determining Levels of Change in Wildlife Habitat Conditions During Next Five Decades

J Primary Criteria Used to Determine Level of Timber Management Impacts on Major Recreation Activities

K Primary Criteria Used to Determine Probable Changes in Potential ACECs

L Analysis of Alternative 5

M Estimation of Employment in Forest Management

N Economic Efficiency

O Analysis of Commercial Forest Land Allocations

P Seral Stage Distribution Concept

APPENDIX A

O&C FOREST RESOURCES POLICY STATEMENT

Bureau of Land Management (BLM)
O&C Forest Resources Policy

This statement sets forth BLM policy for management of the Revested Oregon and California (O&C) Railroad and reconveyed Coos Bay Wagon Road Grant lands situated in the State of Oregon. It reflects the provisions of the Act of August 28, 1937 (O&C Act), and the effects of other relevant legislation and Executive Orders.

The BLM manages 2.1 million acres of O&C lands in western Oregon. The revenues and employment generated by timber sales, conversion of timber to wood products, and other marketable values derived from these lands significantly affect the State and local economies. It is further recognized that public use of these lands through consumptive and non-consumptive recreation, including sport hunting and sport and commercial harvest of salmon and steelhead produced in streams on the O&C lands, also contributes to the local and State economies. The primary objectives of the management program on the O&C lands are to manage for a high-level and sustained yield output of wood products needed to contribute to the economic stability of the local communities and industries, and to provide for other land uses as established in the O&C Act and other legislation.

The following principles will guide BLM in managing the forest resources on O&C lands:

1. Resource management plans or management framework plans as developed through the land-use planning process shall constitute the primary guides for carrying out legislative mandates and Bureau policies.

2. All O&C land administered by BLM in western Oregon will be classified according to the Timber Production Capability Classification. Lands classified as suitable for timber production shall be managed for timber and wood product production, to the extent possible, under the requirements of law. Lands classified as nonsuitable for timber producton shall be allocated to the fullest extent possible to meet the needs for non-timber public land uses. Where non-suitable lands cannot adequately provide for other uses set forth in the O&C Act and other applicable legislation and Executive Orders, suitable lands may be managed to meet the needs for the following:

    a. Maintenance of water quality in accordance with Federal and State standards. Timber harvesting may be restricted or excluded only in areas where mitigating measures will not maintain water quality standards.

    b. Protection of wetlands, including riparian zones. Timber harvesting may be restricted or excluded only in areas where mitigating measures will not be effective.

    c. Conservation of specifically identified habitats for Federally listed, threatened and endangered species. Timber harvesting may be restricted or excluded only in areas where mitigating measures will not be effective.

d. Research and development pertinent to the management of the land resources. Timber harvesting may be restricted or excluded only in areas where mitigating measures will not maintain resource values, and research is assessing these values: timber harvesting may be restricted or excluded pending the research conclusions.

e. Consideration of State goals and objectives concerning State-listed, threatened and endangered species in land-use planning and management. Restrictions may be utilized to achieve the habitat objectives developed from the BLM plans.

f. Consideration of habitat needs of native species. Restriction of timber harvest may be considered when these habitat needs cannot be met through established timber harvest practices.

g. Protection of developed high-value recreation areas, including the visual quality of significant scenic areas. Restriction or exclusion of timber harvest may be considered in the protection of established recreation facilities. Timber harvest may be restricted in the protection of scenic areas only where mitigating measures will not prove effective.

3. The allowable cut determination shall be based on a nondeclining harvest level over time. Departures from the nondeclining harvest level may be permitted in either direction. Any increases shall not exceed the long-term sustained yield capacity of the land; decreases shall be economically and/or biologically justified and timed so as to minimize impacts on dependent industries and local economies.

Appendix B

DEVELOPMENT OF ALTERNATIVES

Alternatives were identified during planning and the scoping and public comment phases of the environmental analysis process. Each alternative analyzed in this EIS contains a mix of variables encompassing a range of choices for decisionmakers as required by the CEQ Regulations (40 CFR 1502.2 (2)).

The primary variables used to determine sustained yield allowable cut are land classification, acres allocated to timber production and enhancement of growth assumed from specific development practices or treatments. Following in the order of occurrence are brief descriptions of the inventories and processes employed to determine the allowable cut level for the alternatives.

Land Classification and Inventory

Timber Production Capability Classification

Timber Production Capability Classification (TPCC) for the SYUs was initiated in 1972. The purpose of TPCC is to categorize BLM-administered land according to its physical and biological capacity to produce timber. TPCC was conducted in accordance with Oregon Manual Supplement 5250.

TPCC identifies commercial coniferous forest land capable of producing timber on a sustained yield basis. These lands form the timber production base for computation of the annual allowable harvest. Approximately 130,700 acres are identified in this category. TPCC also identifies about 12,000 acres of commercial coniferous forest land which cannot be harvested without significant site degradation. These lands are excluded from the timber production base because economically feasible technology is not available to mitigate damage. The remainder of the SYUs' 159,900 acres consists of hardwoods, non-forest or non-commercial forest. As new data become available from on-site stand examinations or improvements occur in technology, some classifications may be changed.

Operations Inventory

For BLM to effectively manage timber, specific information about the location and current condition of the various forest types on the land base must be available to the managers. This is accomplished through the Operations Inventory (OI) in accordance with procedures contained in the Operations Inventory Handbook (STORMS).

The OI is an intensive inventory providing forest type maps which show the location and classification of each homogeneous forest type island (see Glossary). OI record cards list acreages, volumes, silvicultural needs and opportunities for application of forest management practices on each type island. OI thus provides a basis for establishing priorities for treatment according to stand conditions and productivity.

1978 Forest Reinventory

A reinventory of commercial forest land in the SYUs was completed in 1979 employing procedures for extensive inventory (see Glossary) jointly developed by the USFS and BLM. The reinventory is based on the design used for determination of the present allowable cut. It has been refined to include stratification of commercial forest land based on information obtained from the TPCC and OI.

The reinventory indicates a forest distribution as displayed in Table B-1. Age classes range from non-stocked, where reproduction has not been established, to 700 years.

Table B-1 Existing Acres by Age Class
on All BLM-Administered Forest Lands

Age Class	Acres	Age Class	Acres
Non-stocked	9,846	240	818
1-5	6,330	250	503
10	9,336	260	503
20	13,951	270	590
30	11,484	280	736
40	11,052	300	4,040
50	5,015	310	503
60	3,828	330	503
70	5,401	370	503
80	6,604	390	315
90	8,905	400	5,540
100	13,858	410	1,091
110	4,229	420	3,026
120	3,599	430	1,004
130	3,751	440	503
140	2,247	450	590
160	593	460	503
190	733	470	503
200	466	500	818
210	1,214	550	1,128
220	590	700	590
230	736	Total	148,078

Other Resource Inventories

Inventories were conducted to identify and categorize specific capability and potential of resources other than timber. Recreation planners applied the BLM's Recreation Information System, an inventory approach for determining inherent potential of the land to support various recreation activities. Visual resource specialists inventoried and classified the SYUs for visual and esthetic considerations. A review and compilation of known cultural resource data (Class I cultural resource inventory) was completed. Wildlife biologists inventoried general habitat conditions and special habitats, such as northern spotted owl nest sites. Fisheries biologists conducted surveys of streams within the district. Botanical surveys for threatened and endangered plants were initiated for the Salem District in September 1978 and are updated yearly.

Land Use Allocation

Following inventory and analysis, broad land use alternatives were identified and analyzed by the District planning team. These alternatives were circulated for public review and comment in 1981. The next step of the process involved selection of a preferred alternative. This alternative was devised using public input and evaluation criteria prepared in conjunction with the BLM Oregon State Office, Eugene District Office and Roseburg District Office. Each of the broad land use alternatives was evaluated according to the degree to which it would:

- Maintain or increase sustained yield timber production to meet regional and national needs.
- Minimize soil loss caused by management activities (including road construction) and uncontrolled activities (e.g., off-road vehicle use).
- Contribute to the improvement or maintenance of water quality in streams, rivers and municipal watersheds, compared to current conditions.
- Minimize impacts on air quality in residential areas.
- Meet demands for developed and dispersed recreation opportunities on BLM-administered land.
- Maintain the visual quality of the forest landscape in areas of high scenic value and/or high sensitivity.
- Protect, improve and develop fish spawning, rearing and migration habitat.
- Protect important wildlife habitat.
- Protect or enhance habitat of threatened or endangered plant and animal species.
- Provide for Research Natural Areas and similar areas for scientific and educational study.
- Protect significant archeological and historic sites.
- Maintain or increase local employment and personal earnings dependent on each resource program administered by the Salem District.
- Maintain or increase contributions to local public revenues derived from each resource program administered by the Salem District.

- Demonstrate consistency with officially approved resource-related plans, programs and policies of other Federal agencies.

- Demonstrate consistency with State planning goals (Land Conservation and Development Commission) and acknowledged local comprehensive plans.

The results of this evaluation, combined with public input, produced the preferred land use alternative. The preferred land use alternative provided the basis for development of the original proposed action in this EIS.

Scoping (see Appendix C) of the EIS led to the conclusion that six land use allocation alternatives should be analyzed in depth (original proposed action and Alternatives 1-4 and 7). Alternatives 5 and 6 are modifications of the original proposed action (with same land allocations).

Alternative 8, termed the new preferred alternative, was developed between draft and final EIS. It is a modification of the original proposed action and is based on additional public input, policy review and economic considerations.

One of the many factors examined in alternatives assessment was timber harvest foregone due to land allocations for other resource values. Table B-2 is a summary of the data used in this part of the assessment.

When final timber management decisions are made, they will form the management prescriptions. Similarly, actions for other resources, e.g., habitat management plans, will be within land use plan guidelines.

Table B-2 Timber Harvest Foregone Due to Land Use Allocations

Land Use Category	Alternatives (MM bd. ft./year)						
	OPA,5,6	1	2	3	4	7	8
No Planned Harvest							
TPCC	8.5	8.5	8.5	8.5	8.6	6.3	8.5
VRM	1.4	0	1.7	2.6	4.4	2.0	0
Recreation Sites/Lands	1.7	1.3	1.0	0.2	8.1	2.4	0.5
Riparian Zones	6.2	0	4.0	3.4	3.7	0.7	5.7
Mid-Age and Old-Growth Forest	0	0	1.7	8.5	0	0	8.9
Misc. (ACEC, Cultural, etc.)	0.9	0.4	0.7	0.6	1.1	0	0.9
Constrained Harvest							
ACEC	0.6	0	0	0	0	0	0.6
VRM	0.5	0	4.9	3.4	2.8	0.2	0.7
Mid-Age and Old-Growth Forest	8.4	0	0	0	26.3	0	0
Riparian Zones	0	0	2.3	0	0	1.0	0
Misc.	0	0	1.2	0	0	0.1	0
Total	28.2	10.2	26.0	27.2	55.0	12.7	25.8

Allowable Cut Computation

Forest Simulation Model

A computerized forest simulation model (SIMIX) is used to determine the highest sustainable allowable cut for each alternative. SIMIX calculates the allowable cut associated with the stated forest management plan. It can maximize an even-flow level of cut for some specific management regime, or a series of cut levels may be specified for as many as the first 10 decades followed by an even-flow level for the remainder of the projected period (40 decades). This lengthy projection period is not an attempt at a 400-year plan. It is used only to assure that the planned allowable cut can be sustained.

The clearcut option of SIMIX was utilized, since clearcutting is the predominant harvest method in all alternatives. In order to provide a more accurate estimation of the total wood fiber in logs which could be sold for lumber and plywood, the allowable cut is computed and projected into the future on the basis of cubic feet. Based upon the age and size of timber projected for harvest during the first decade, the computed even-flow cubic foot volume will be converted to Scribner volume for sale purposes.

SIMIX computes the harvest level based on present inventory and projected growth resulting from the application of certain management practices (mortality salvage, precommercial and commercial thinning, commercial thinning only, genetic improvement and final harvest cuts). Fertilization is included in conjunction with one or more of the above treatments. Inputs to SIMIX are type and timing of treatments and number of acres to be treated. No rotation age is set. Instead, a minimum cutting age constraint is specified. SIMIX is not designed to handle economic values or costs, and it does not seek out alternative schedules or strategies.

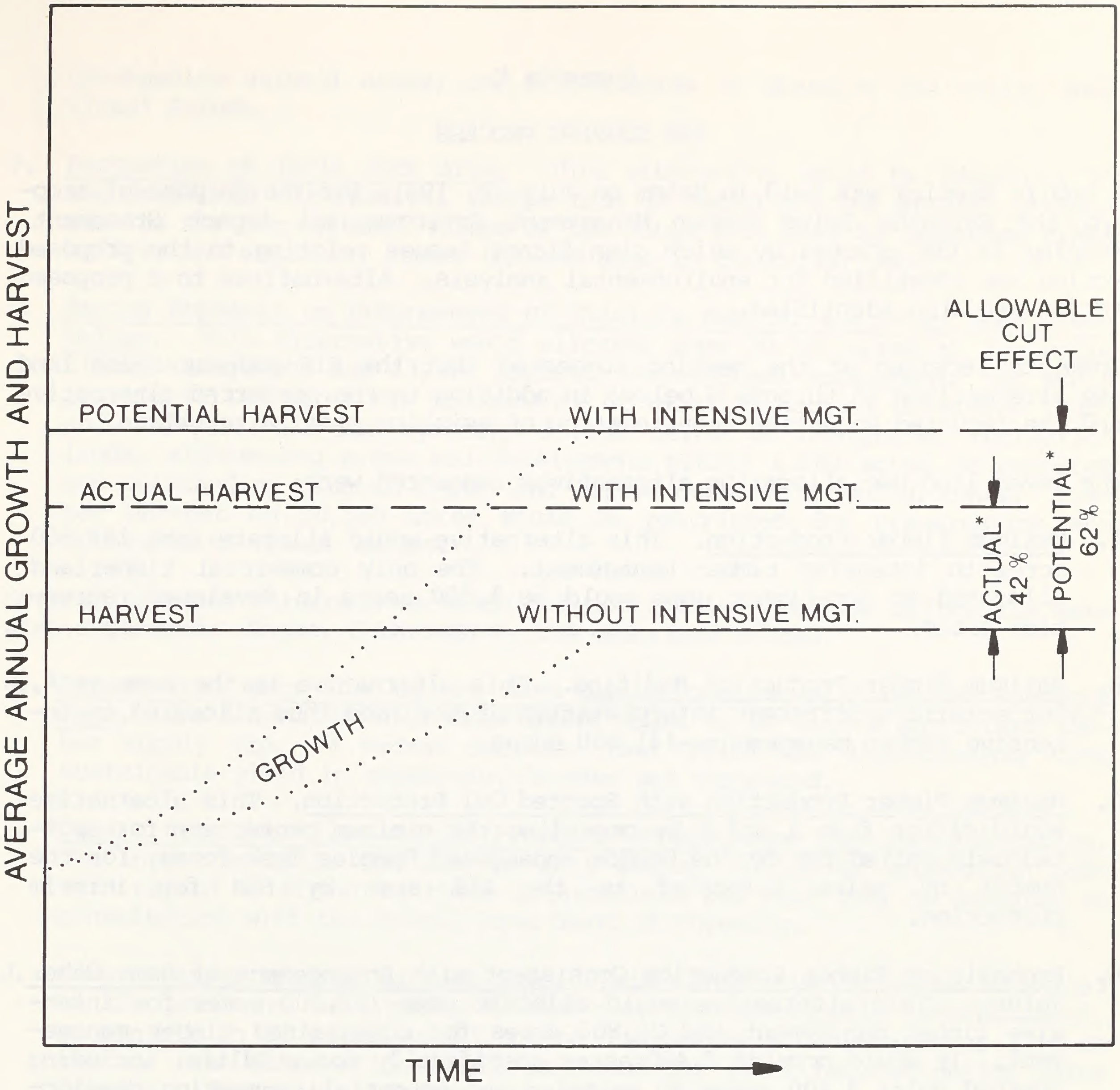
The model, designed for forests under an even-aged system of management, produces output data by decades for each age and treatment class and summarizes them numerically and graphically. These data include level of growing stock, annual growth, acreage by silvicultural practice and volume by harvesting practice. Consequently, it permits alternative plans to be evaluated on the basis of their respective production levels and fiscal requirements and serves as a basis for programming personnel and funds for the alternative selected. In effect, a management plan is developed that schedules the production from commercial thinning, mortality salvage and final harvest operations and also the acreages for such treatments as reforestation and precommercial thinning.

The Allowable Cut Effect (ACE)

A forest that is composed primarily of old-growth timber and recently cutover stands exhibits a relatively low average annual growth. This results from slow or negative growth of the old stands and the fact that growth is not measurable (in end-product terms) in the young stands until they reach 20 to 30 years of age. Such a forest is in transition from an unmanaged to a managed or regulated state. Regulation is achieved when annual harvest and annual growth are in equilibrium and the forest is producing wood, in terms of desired product objective, at maximum capacity. At this point, maximum yield on a sustainable basis is reached. To compute an allowable cut on a forest in the transition state, using growth rates not reflecting anticipated impacts of future management, would be extremely conservative and would greatly lengthen the time until the regulated state was achieved. BLM uses an alternative approach which is to project growth into the future based upon assumptions about management levels and to utilize excess harvest-age timber to bridge the time gap until the ultimate growth level is achieved. This process of taking credit now for future growth increases expected to result from management has been termed the "Allowable Cut Effect" (ACE).

Figure B-1 illustrates this process in the context of conditions found in the SYUs, before land use allocations were made for other resource activities. This forest is in the early to middle transition stage and, as the recent inventory found, it has a relatively low average annual growth rate. An initial computation was made that assumed no intensive management practices were performed. Under this scheme, stands were projected to grow along a growth curve typifying normal unmanaged forests. The lower growth curve in Figure B-1 shows the average annual growth path projected from these assumptions. When tested on the allowable cut model, the current level of harvest age timber and existing age-class distribution of the forest yielded a maximum nondeclining harvest level of 12.2 million cubic feet in a long phase-in to a regulated forest condition.

Next, a high level of management was assumed. Practices (see Chapter 1, Forest Management Treatments and Design Elements) such as genetic improvement, precommercial and commercial thinning, stand conversion, fertilization and mortality salvage were used in projecting yield functions. The basis for most of these projections was the DFIT model. The higher growth curve in Figure B-1 shows the average annual growth path resulting from the intensive management assumptions. When tested on the allowable cut model, it was determined that there was only enough harvest age timber available to take credit for a portion of the expected future growth increases. For full ACE credit to apply, there must be enough harvestable timber available to make the transition from the current slower-growing forest to the regulated, intensively-managed forest of the future growing at a maximum rate. Since this was not the case in the SYUs, the allowable cut effect applied was limited to about 68 percent of the projected potential allowable cut effect. To set a cut level higher than the "actual" would cause a drop in future cut levels, a violation of Bureau policy. Essentially, the limited volume of standing harvest age timber adds an element of conservatism to the allowable cut computation process, because it limits the credit that can be taken now for future intensive management.



* Percent increase above the harvest level computed without intensive management.

FIGURE B-1

ALLOWABLE CUT EFFECT

Appendix C

THE SCOPING PROCESS

A public meeting was held in Salem on July 14, 1981, for the purpose of scoping the Eastside Salem Timber Management Environmental Impact Statement. Scoping is the process by which significant issues relating to the proposed action are identified for environmental analysis. Alternatives to a proposed action are also identified.

Comments received at the meeting suggested that the EIS address seven land use alternatives (A through G below) in addition to the preferred alternative and the required No Action (continuation of existing plan) alternative.

The seven land use allocation alternatives suggested were:

A. Maximum Timber Production. This alternative would allocate some 129,500 acres to intensive timber management. The only commercial timberland allocated to non-timber uses would be 1,500 acres in developed recreation sites.

B. Maximum Timber Production Modified. This alternative is the same as A, but entails a different interpretation of the land thus allocated to intensive timber management--141,800 acres.

C. Maximum Timber Production with Spotted Owl Protection. This alternative would differ from A and B by providing the minimum protection for spotted owls called for by the Oregon Endangered Species Task Force, for the number of pairs allocated to the EIS area by BLM for interim protection.

D. Emphasis on Timber Production Consistent with Enhancement of Some Other Values. This alternative would allocate some 102,300 acres for intensive timber management and 20,800 acres for constrained timber management. It would provide 2,400 acres specifically for wildlife, including spotted owls; 4,400 acres in existing and potential recreation development sites; 6,700 acres in riparian zones; 380 acres of research and outstanding natural areas; and 11,600 acres to preserve and retain some visual values.[1]

E. Moderate Emphasis on Timber Production Combined with Preservation of Old Growth and Enhancement of Other Non-Timber Values. This alternative would allocate some 108,900 acres to intensive timber management and 7,500 acres to constrained management. It would provide 10,960 acres of mostly old-growth conifer habitat specifically for wildlife (no timber harvest); 4,100 acres of recreation sightseeing areas and development sites; 5,800 acres in riparian zones; 1,720 acres of research and

[1] Non-timber allocations are not additive due to overlap and cannot be compared to intensive and constrained timber allocations due to inclusion of non-forest lands, fragile sites, etc.

outstanding natural areas; and 22,600 acres to preserve and retain some visual values.

F. Protection of Table Rock Area. This alternative would be identical to the preferred alternative, except that it would provide greater protection to the recreational values of the Table Rock area by expanding trail buffers and extending timber harvest ages in the buffer zone.

G. Strong Emphasis on Enhancement of Wildlife Habitat and Other Non-Timber Values. This alternative would allocate some 70,100 acres to intensive timber management and 43,500 acres to constrained management. It would provide 45,480 acres for maintenance of wildlife habitat diversity (200- and 350-year harvest cycles); 16,600 acres of designated recreation lands, sightseeing areas and development sites; 1,880 acres of research and outstanding natural areas; and 10,900 acres in riparian zones. Timber harvest on 30,300 acres would be restricted for preservation and retention of visual values.

Several relevant alternatives which did not involve land use allocation were also suggested. These, H through M, are described below.

H. Depart from Even Flow on the Land Use Allocation of B on the Previous Page. The intent of this alternative would be to fill a short-term timber supply gap. A modest increase that would not significantly drop sustainable yield in subsequent decades was suggested.

I. Depart from Even Flow on the Preferred Alternative Land Use Allocation. The intent would be the same as in H above. A further suggestion made with regard to either of these alternatives was that they be designed in consultation with the Oregon Department of Forestry.

J. Lower Average Minimum Harvest Size. This alternative would be identical to the preferred alternative except that the sustainable harvest level, attainable in 60 years, would not be limited by a constraint of 17-inch average tree diameter in stands selected for final harvest during later decades. Under this alternative, future decade harvests in the Santiam Sustained Yield Unit would be expected to take 40-year-old stands during one decade and 50-year-old stands during other decades.

K. Minimum Harvest Age of 70 Years. The assumption would be made that no timber stands younger than approximately 70 years would be harvested in any future decade.

L. Combine Allowable Cuts for the Two Sustained Yield Units. In this alternative the data base for the two sustained yield units involved in the EIS area would be combined for a single allowable harvest calculation.

M. No Control of Competing Vegetation with Herbicides. This alternative is identical to the preferred alternative except that no herbicides would be used to control grass, brush or hardwood species growing in competition with commercial conifers. Control of vegetation for timber management by burning, grazing or using mechanical or manual means would be prescribed where economically feasible.

Our review of these suggestions after the meeting led us to the following conclusions:

A & B - These alternatives are, in concept, identical. The 141,800 acres properly defines the area that would be available for intensive timber management. The alternative is important to define one end of the range of reasonable alternatives.

C - This alternative is merely an intermediate step between Alternatives B and D, with no additional dimension. Interest in it stemmed from the fact that it would specifically focus attention on the economic trade-offs involved in implementing the recommendations of the Task Force. Analysis of Alternative D would also address this, as well as other issues. For those who are interested in the specific trade-off involved in this one allocation, we have calculated that such an alternative would permit annual timber harvests of 2.2 MM bd. ft. less than Alternative B.

D - This alternative was widely supported for analysis in the public meeting. No modifications were suggested.

E - Some comments in the public meeting suggested that the original definition of Alternative E by BLM staff was confusing. Definition of this as a useful mid-range alternative will be clarified.

F - This alternative would address a very specific issue with only a few impacts notably different from those of the preferred alternative. To address that issue most efficiently, it can be combined with Alternative E.

G - This alternative is important to define one end of the range of reasonable alternatives.

H & I - Discussion with staff of the Oregon Department of Forestry brought out the opinion that the land use allocation alternatives which emphasize timber harvest would be essentially responsive to the expected timber supply deficit in the EIS area. Thus, analysis of a departure from even flow in the preferred alternative land use allocation is most relevant. A one-decade increase in harvest which caused subsequent harvests to fall only 1 MM bd. ft. below the non-declining even-flow level would be most relevant to analyze, on the preferred alternative timber management base. Department of Forestry staff assumed that technology advances in a decade would easily compensate for the assumed harvest decline. The one-decade increase would produce 6 MM bd. ft. additional annual harvest while causing the 1 MM bd. ft. drop for only the second and third decades.

J - This alternative tests an issue which is useful to analyze. For efficiency it can be combined with Alternative I to provide a single alternative analyzing all realistic options to accelerate the harvest on a given land use allocation base. The minimum final harvest age would be lower only in the Santiam SYU, dropping from 60 years to 50 years in decades 6-8 and 10-32 and to 40 years in decade 9. This would produce an additional 2 MM bd. ft. of annual harvest. Timber in these younger stands would have an average diameter of 13 inches and 11 inches respectively.

K - Of all the alternatives suggested at the scoping meeting, this one received by far the least audience support for analysis. The main thrust of it is to balance Alternative J, but it does not address any issue raised during the scoping process. The alternative would result in an allowable cut some 15 MM bd. ft. below that of the preferred alternative.

L - Based on past experience with such combined allowable cut runs, BLM staff does not believe this alternative would look significantly different than the separate runs. Analysis of impacts on a separate EIS alternative would not appear to serve any useful purpose.

M - This alternative would address an issue which is significant in most of western Oregon.

It was concluded that the EIS should analyze the following alternatives:

The proposed action (preferred alternative)
Alternative 1 (B and H combined): Maximum Timber Production.
Alternative 2 (D): Emphasis on Timber Production, Enhancement of Some Other Values.
Alternative 3 (E and F combined): Moderate Emphasis on Timber Production, Preservation of Old-Growth Habitat, Enhancement of Other Non-timber Values.
Alternative 4 (G): Strong Emphasis on Enhancement of Wildlife Habitat and Other Non-timber Values.
Alternative 5 (I and J combined): Accelerate Timber Harvest from Preferred Alternative Timber Management Base.
Alternative 6 (M): No Control of Competing Vegetation with Herbicides.
Alternative 7: No Action (no change).

Discussion of the possible alternatives with the Salem District's Multiple Use Advisory Council on July 15 brought out the suggestion that the aerial herbicide spray stream buffers should be limited to 75 feet in the Maximum Timber alternative. Generally, this alternative is considered to be constrained by the requirements of the Oregon Forest Practices Act. The herbicide buffers in it will be consistent with those requirements.

Attendees at the public scoping meeting provided useful comments on issues that should be addressed in the EIS. Included were suggestions on more specific definition of issues related to water supply, wildlife, fish, recreation and economic aspects of the alternatives.

Opinion of the attendees was mixed on the question of whether to hold an unstructured public meeting or a formal hearing after release of the Draft EIS. In light of the divergent opinions on this issue, a public meeting with maximum opportunity for dialogue between the public and Bureau officials seems most useful.

Appendix D

ECOSYSTEM MANAGEMENT

This appendix contains a brief discussion of ecosystem management and its relationship to the original proposed action, Alternative 4 and Alternative 8 (new preferred alternative). Other alternatives would not achieve the objectives of ecosystem management.

Ecosystem management is defined as retention of all interacting natural systems (consisting of both living and nonliving components) that presently occur or could occur within the SYUs. Ecosystem management would be achieved through maintenance of maximum habitat diversity which, in turn, would provide for maximum diversity of wildlife species. In the forest environment, this means managing for all successional stages, each with unique horizontal and vertical structure, in addition to special habitats such as dry meadows, wetlands, talus slopes, cliffs and riparian zones. Besides simply retaining forested habitats, special effort§ would be made to maintain proper stand conditions for wildlife. This would be necessary because management activities such as mortality salvage and commercial thinning could adversely alter structure of the natural stand important to wildlife.

Ecosystem management provides a comprehensive approach to the management of the estimated 327 species of terrestrial vertebrates in the SYUs. However, featured species such as elk, deer and the northern spotted owl would receive special emphasis within the comprehensive ecosystem approach.

In the following discussion of the original proposed action, Alternative 4 and Alternative 8, old-growth (196+ years old) and mature (116-195 years old) habitats are emphasized because of relative scarcity in the SYUs. However, all existing habitat types would be retained under these alternatives.

Original Proposed Action

This alternative would retain old-growth coniferous forest by use of 350-year harvest rotation in a large block (1,920 acres) and small block (240 acres) pattern within a 2- to 4-mile-wide corridor over BLM-administered lands in the SYUs. Management of the blocks would proceed as follows: (1) undisturbed conditions would be maintained on oldest forest stands until 640 acres of contiguous old growth were available in large blocks and 80 acres in small blocks; (2) younger forest stages would be harvested within the large and small blocks to develop an even distribution of age classes to perpetuate long harvest rotations; and (3) areas would be reforested after harvesting, with natural stand development allowed until next harvest.

The large blocks of 1,920 acres were selected to maintain 640 acres as old-growth and mature forest and 1,280 acres which would eventually serve as replacement for harvested older stands. The core size of 640 acres was required to provide habitat for secretive and/or wide-ranging species such as fisher and marten. An identical management scheme was utilized for the small blocks except that an area of 240 acres was selected to maintain 80 acres as old-growth forest and 160 acres as replacement stands. The stand size of 80 acres was a minimum requirement of forest interior birds.

These small blocks of old-growth forest would be distributed at approximately 1-mile intervals to encourage animal movement between both small and large blocks.

Private and public lands fall within the corridor. However, only selected BLM-administered land would be managed for wildlife. The corridor would facilitate gene flow within those species which find their optimum habitats in older seral stages. Corridors would prevent genetic isolation and maintain the current diversity of wildlife species finding optimum habitat in older coniferous forests.

Alternative 4

Techniques to manage older coniferous forest would be identical to those of the original proposed action except that blocks would be evenly distributed throughout BLM-administered land (not in a corridor), and a 200-year harvest rotation would be initiated in addition to the 350-year rotation plan.

Alternative 8

This alternative would retain old-growth coniferous forest by excluding timber harvest for one decade in a large block (± 1,200 acres) and small block (± 160 acres) pattern within a 2- to 4-mile-wide corridor. Timber would be harvested only in the event of catastrophic losses. The rationale for this management concept is the same as in the original proposed action. Research during the coming decade will be used to determine the need for a permanent system to retain older forest.

Appendix E WILDLIFE SPECIES & HABITAT USE

			Habitat Use												
			Conifer Habitat						Other Habitat						
Mammals	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Common Opossum (Didelphis marsupialis)	P	C	U	U	U	U			U	O	U	O	U		
Vagrant Shrew (Sorex vagrans)	P	C	U	U	U	U	U	U	U	O	U	O		U	
Dusky Shrew (Sorex obscurus)	P	C	U	U	U	U	U	U	U	O	U	O		U	
Marsh Shrew (Sorex bendirii)	P	C	U	U	U	U	U	U	U	O		O			
Trowbridge's Shrew (Sorex trowbridgii)	P	C	U	U	U	U	U	U	U	O	U	O			
Shrew-mole (Neurotrichus gibbsii)	P	C	U	U	U	U	O	O	U	U	U	U		U	
Townsend's Mole (Scapanus townsendii)	P	C	O	U	U	U			U		O				
Coast Mole (Scapanus orarius)	P	C	O	U	U	U	U	U			O				
Little Brown Myotis (Myotis lucifugus)	P	C	U	U	U	U	O	O	U	U	U	U	O	O	U
Yuma Myotis (Myotis yumanensis)	P	U		U	U	U	O	O	U	O		O	O	O	
Long-eared Myotis (Myotis evotis)	P	C	U	U	U	U	O	O	U	U	U	U	O	O	
Long-legged Myotis (Myotis volans)	P	C	U	U	U	U	O	O	U	U	U	U	O	O	U
California Myotis (Myotis californicus)	P	C	U	U	U	U	O	O	U	U	U	U	O	O	
Silver-haired Bat (Lasionycteris noctivagans)	P	C	U	U	U	U	O	O	U	U	U	U	O	O	U
Big Brown Bat (Eptesicus fuscus)	P	C	U	U	U	U	O	O	U	U	U	U	O	O	U
Hoary Bat (Lasiurus cinereus)	P	C		U	U	U	O	O	U	O		U	U	U	
Townsend's Big-eared Bat (Plecotus townsendii)	P	C	U	U	U	U	U	U	U	U	U			O	U
Pallid Bat (Antrozous pallidus)	P	R	U	U	U				U	O	U	O	U	O	
Pika (Ochotona princeps)	P	R												O	
Brush Rabbit (Sylvilagus bachmani)	P	C	U	U	U				U	U	U	U			

LEGEND

Resident
P = Permanent
W = Winter
M = Migratory
S = Summer

Relative Abundance
C = Common
U = Uncommon
R = Rare
O = Occasional

Habitat Use
U = Utilizes
O = Optimum

Appendix E WILDLIFE SPECIES & HABITAT USE

			Habitat Use												
			Conifer Habitat						Other Habitat						
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Eastern Cottontail (Sylvilagus floridanus)	P	R	U	U					U	U	U	U			
Snowshoe Hare (Lepus americanus)	P	C	U	U	U	U	U	U	U	U	U	U			
Mountain Beaver (Aplodontia rufa)	P	C	U	U	U	U	U	U	U	U	U	U			
Townsend's Chipmunk (Eutamias townsendii)	P	C	U	U	U	U	U	U	U	U	U	U	U	U	
California Ground Squirrel (Spermophilus beecheyi)	P	C	U	U					U	U	U			U	
Western Gray Squirrel (Sciurus griseus)	P	R			U	U	U	U	O	U			O		
Douglas Squirrel (Tamiasciurus douglasii)	P	C			U	U	O	O	U	U			O		
Northern Flying Squirrel (Glaucomys sabrinus)	P	C				U	O	O	U	U			O		
Mountain Pocket Gopher (Thomomys monticola)	P	U	O	U							O				
Western Pocket Gopher (Thomomys mazama)	P	C	O	U							O				
Camas Pocket Gopher (Thomomys bulbivorus)	P	U	O	U							O				
Beaver (Castor canadensis)	P	C	U	U	U	U	U	U	U	O	U	O			
Deer Mouse (Peromyscus maniculatus)	P	C	U	U	U	U	U	U	U	U	U	U	U	U	
Dusky-footed Woodrat (Neotoma fuscipes)	P	C	U	U	U	U	U	U	U	U	U	U	U	U	
Bushy-tailed Woodrat (Neotoma cinerea)	P	C	U	U	U	U	O	O	U	U	U	U	U	U	
Western Red-backed Vole (Clethrionomys occidentalis)	P	C	U	U	U	U	O	O	U	U	U	U		U	
Red Tree Vole (Phenacomys longicaudus)	P	C				U	O	O		U		U	U		
Creeping Vole (Microtus oregoni)	P	C	U	U	U	U	U	U	U	U	U	U			
Water Vole (Microtus richardsoni)	P	R								O		O			
Townsend's Vole (Microtus townsendii)	P	C	U	U	U				U	O	U	O			
Long-tailed Vole (Microtus longicaudus)	P	C	U	U	U				U	O	U	O		U	
Muskrat (Ondatra zibethicus)	P	C	U							O		O			
Norway Rat (Rattus norvegicus)	P	C													U
House Mouse (Mus musculus)	P	C													U
Pacific Jumping Mouse (Zapus trinotatus)	P	C	U	U	U	U	U	U	U	O	U	O			
Porcupine (Erethizon dorsatum)	P	C	U	U	U	U	U	U	U	U	U	U	U	U	
Nutria (Myocaster coypus)	P	C								O		O			
Coyote (Canis latrans)	P	C	U	U	U	U	U	U	U	U	U	U		U	

Appendix E WILDLIFE SPECIES & HABITAT USE

			Habitat Use											
			Conifer Habitat						Other Habitat					
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Red Fox (Vulpes fulva)	P	C	U	U	U	U	U	U	U	U	U	U			
Gray Fox (Urocyon cinereoargenteus)	P	C	U	U	U	U	U	U	U	U	U	U		U	
Black Bear (Ursus americanus)	P	C	U	U	U	U	O	O	U	U	U	U	U	U	
Raccoon (Procyon lotor)	P	C	U	U	U	U	U	U	U	O	U	O	U	U	
Marten (Martes americana)	P	R			U	U	O	O	U	U		U	U	U	
Fisher (Martes pennanti)	P	R	U	U	U	U	O	O	U	U	U	U	U	U	
Ermine (Mustela erminea)	P	C	U	U	U	U	O	O	U	U	U	O	U	U	
Long-tailed Weasel (Mustela frenata)	P	C	U	U	U	U	U	U	U	U	U	U	U	U	
Mink (Mustela vison)	P	C	U	U	U	U	U	U	U	O	U	O			
Western Spotted Skunk (Spilogale gracilis)	P	C	U	U	U				U	U	U	U			
Striped Skunk (Mephitis mephitis)	P	C	U	U	U				U	U	U	U		U	
River Otter (Lutra canadensis)	P	U								O		O			
Mountain Lion (Felis concolor)	P	U	U	U	U	U	O	O	U	U	U	U		O	
Bobcat (Felis rufus)	P	C	U	U	U	U	O	O	U	U	U	U		O	
Roosevelt Elk (Cervus elaphus roosevelti)	P	C	U	U	U	U	O	O	U	O	O	U			
Columbia Black-tailed Deer (Odocoileus hemionus columbianus)	P	C	O	O	U	U	O	O	U	U	U	U			
Birds															
Common Loon (Gavia immer)	P	U								O		O			
Arctic Loon (Gavia arctica)	W	R								O		O			
Red Throated Loon (Gavia stellata)	W	R								O		O			
Red Necked Grebe, (Podiceps griseigena)	P	R								O		O			
Horned Grebe (Podiceps auritus)	P	R								O		O			
Eared Grebe (Podiceps nigricollis)	P	R								O		O			
Western Grebe (Aechmophorus occidentalis)	P	R								O		O			
Pied-billed Grebe (Podilymbus podiceps)	P	U								O		O			

Appendix E WILDLIFE SPECIES & HABITAT USE

	Habitat Use														
	Conifer Habitat								Other Habitat						
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Double-crested Cormorant (Phalacrocorax auritus)	P	U								O		O			
Great Blue Heron (Ardea herodias)	P	U	U	U	U	U	O	O	U	O		O	U		
Green Heron (Butorides striatus)	P	U					U	U		O		O			
Great Egret (Casmerodius albus)	P	R								O		O			
Black-crowned Night Heron (Nycticorax nycticorax)	P	R					U	U		O		O			
American Bittern (Botarus lentiginosus)	P	R								O		O			
Whistling Swan (Cygnus columbianus)	W	R	U							O		O			
Canada Goose (Branta canadensis)	P	U	U							O		O			
White-fronted Goose (Anser albifrons)	M	R	U							O		O			
Snow Goose (Anser caerulescens)	M	R	U							O		O			
Mallard (Anas platyrhynchos)	P	C	U	U	U	U	U	U	U	O		O			
Gadwall (Anas strepera)	P	R	U							O		O			
Pintail (Anas acuta)	P	C	U							O		O			
Green-winged Teal (Anas crecca)	P	C	U							O		O			
Blue-winged Teal (Anas discors)	S	U	U							O		O			
Cinnamon Teal (Anas cyanoptera)	S	U	U							O		O			
European Wigeon (Anas penelope)	W	R	U							O		O			
American Wigeon (Anas americana)	P	C	U							O		O			
Northern Shoveler (Anas clypeata)	P	R	U							O		O			
Wood Duck (Aix sponsa)	P	U				U	U	U	U	O		O	O		
Redhead (Aythya americana)	P	R	U							O		O			
Ring-necked Duck (Aythya collaris)	P	U	U							O		O			
Canvasback (Aythya valisineria)	P	U	U							O		O			
Greater Scaup (Aythya marila)	W	U	U							O		O			
Lesser Scaup (Aythya affinis)	P	U	U							O		O			
Common Goldeneye (Bucephala clangula)	W	U								O		O	O		
Barrow's Goldeneye (Bucephela islandica)	P	U								O		O	O		

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			Habitat Use												
			Conifer Habitat						Other Habitat						
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Bufflehead (Bucephela albeola)	W	U					U	U		O		O	O		
Harlequin Duck (Histrionicus histrionicus)	P	U								O		O			
White-winged Scoter (Melanitta fusca)	P	R								O		O			
Surf Scoter (Melanitta perspicillata)	P	R								O		O			
Black Scoter (Melanitta nigra)	P	R								O		O			
Ruddy Duck (Oxyura jamaicensis)	P	U	U							O		O			
Hooded Merganser (Mergus cucullatus)	P	U					U	U	U	O		O	O		
Common Merganser (Mergus merganser)	P	U					U	U	U	O		O	O		
Red-breasted Merganser (Mergus serrator)	W	U								O		O			
Turkey Vulture (Cathartes aura)	S	C	U	U				U	U	U	U		U	O	
White-tailed Kite (Elanus leucurus)	P	R	U	U						U	U	U			
Goshawk (Accipiter gentilis)	P	R				U	O	O	U	U	U		U		
Sharp-shinned Hawk (Accipiter striatus)	P	U	U	U	U	U	U	U	U	U	U	U	U		
Cooper's Hawk (Accipiter cooperii)	P	U	U	U	U	U	U	U	U	U	U	U	U		
Red-tailed Hawk (Buteo jamaicensis)	P	U	U	U		U	O	O	U	U	U	U	O	U	
Swainson's Hawk (Buteo swainsoni)	S	O	U	U							U			U	
Rough-legged Hawk (Buteo lagopus)	W	R	U	U					U	U	U	U	U		
Ferruginous Hawk (Buteo regalis)	S	O	U	U							U			U	
Golden Eagle (Aguila chrysaetos)	P	O	U	U		U	O	O	U	U	U	U	O	O	
Bald Eagle (Haliaetus leucocephalus)	P	U	U	U		U	O	O	U	O	U	O	O	U	
Marsh Hawk (Circus cyaneus)	P	O	U							U	U	O			
Osprey (Pandion haliaetus)	S	U					O	O		O	O	O	O	U	
Peregrine Falcon (Falco peregrinus)	P	O	U	U			U	U	U	U	U	U	U	O	
Merlin (Falco columbarius)	P	R	U	U	U	U			U	U	U	U		U	
American Kestrel (Falco sparverius)	P	C	O	U	U	U	U	U	U	U	O	U	O	U	
Blue Grouse (Pendragapus obscurus)	P	C	U	U	O	O	U	U	U	U	U	U			
Ruffed Grouse (Bonasa umbellus)	P	U		U	U	U	U		U	O	U	U			

Appendix E WILDLIFE SPECIES & HABITAT USE

			Habitat Use												
			Conifer Habitat						Other Habitat						
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Bobwhite (Colinus virginianus)	P	R	U	U	U				U	U	U	U			
California Quail (Loohortyx californicus)	P	U	U	U	U				U	U	U	U			
Mountain Quail (Oreortyx pictus)	P	U	U	U	U				U	U	U	U			
Ring-necked Pheasant (Phasianus colchicus)	P	U	U	U					U	U	U	U			
Virginia Rail (Rallus limicola)	P	U	U	U						O		O			
Sora (Porzana carolina)	S	U								O		O			
American Coot (Fulica americana)	P	C								O		O			
Semipalmated Plover (Calidris pusilla)	M	U								O		O			
Killdeer (Charadrius vociferus)	P	C	U							O		O			
American Golden Plover (Pluvialis dominica)	M	R								O		O			
Black-bellied Plover (Pluvialis squatarola)	W	U								O		O			
Black Turnstone (Arenaria melanocephala)	W	O								U		U		U	U
Common Snipe (Capella gallinago)	P	U		U						O		O			
Long-billed Curlew (Numenius americanus)	S	R	U							O		O			
Spotted Sandpiper (Actitis macularia)	P	U								O		O			
Solitary Sandpiper (Tringa solitaria)	M	R								O		O			
Willet (Catoptrophorus semipalmatus)	P	O								O		O			
Greater Yellowlegs (Tringa melanoleucus)	W	U	U							O		O			
Lesser Yellowlegs (Tringa flavipes)	M	O	U							O		O			
Pectoral Sandpiper (Calidris melanotos)	M	U								O		O			
Baird's Sandpiper (Calidris bairdii)	M	R								O		O			
Least Sandpiper (Calidris minutilla)	W	U								O		O			
Dunlin (Calidris alpina)	W	U								O		O			
Short-billed Dowitcher (Limnodromus griseus)	M	U								O		O			
Long-billed Dowitcher (Limnodromus scolopaceus)	M	U								O		O			
Western Sandpiper (Calidris mauri)	M	U								O		O			
Sanderling (Calidris alba)	W	R								O		O			

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			Habitat Use												
			Conifer Habitat						Other Habitat						
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Red Phalarope (Phalaropus fulicarius)	M	O								O		O			
Wilson's Phalarope (Steganopus tricolor)	S	R								O		O			
Northern Phalarope (Lobipes lobatus)	M	O								O		O			
Parasitic Jaeger (Stercorarius parasiticus)	M	O								O		O			U
Glaucous Gull (Larus hyperboreus)	W	O								O		O			U
Glaucous-winged Gull (Larus glaucescens)	P	U								O		O			U
Western Gull (Larus occidentalis)	P	R								O		O			U
Herring Gull (Larus argentatus)	W	U								O		O			U
California Gull (Larus californicus)	P	C	U							O		O			U
Ring-billed Gull (Larus delawarensis)	P	U	U							O		O			U
Mew Gull (Larus canus)	W	O								O		O			U
Bonaparte's Gull (Larus philadelphia)	M	U								O		O			U
Common Tern (Sterna hirundo)	M	R								O		O			U
Black Tern (Chlidonias niger)	S	R								O		O			U
Band-tailed Pigeon (Columba fasciata)	S	C	U	O	U	U	O	O	U	U		O	U	U	
Rock Dove (Columba livia)	P	C	U											U	U
Mourning Dove (Zenaida macroura)	P	C	U	U	U	U	U	U	U	U	U	U	U		
Yellow-billed Cuckoo (Coccyzus americanus)	S	O							U	U		U			
Barn Owl (Tyto alba)	P	U	U	U		U	U	U	U	U	U	U	O	O	U
Screech Owl (Otus asio)	P	U	U	U	U	U	O	O	U	O	U	U	O		
Great Horned Owl (Bubo virginianus)	P	U	U	U	U	U	O	O	U	U	U	O	O		
Snowy Owl (Nyctea scandiaca)	W	O	U	U							U	U			U
Pygmy Owl (Glaucidium gnoma)	P	U	U	U	U	U	O	O	U	U	U		O		
Burrowing Owl (Athene cunicularia)	P	O	U								U				
Northern Spotted Owl (Strix occidentalis)	P	U				U	O	O		U			O		
Long-eared Owl (Asio otus)	P	R	U	U	U	U	U	U	U	U	U	U	O		
Short-eared Owl (Asio flammeus)	P	U	U	U						U	U	O			

Appendix E WILDLIFE SPECIES & HABITAT USE

			Habitat Use												
			Conifer Habitat						Other Habitat						
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Saw-whet Owl (Aegolius acadicus)	P	R				U	O	O	U	O		O	O		
Common Nighthawk (Chordeiles minor)	S	C	U	U					U	U	U	U		U	
Black Swift (Cypseloides niger)	M	O	U								U			U	
Vaux's Swift (Chaetura vauxi)	S	C	U	U	U		O	O	U	U	U	U	O		U
Anna's Hummingbird (Calypte anna)	P	R	O	O	U				U	U	O	U			
Rufous Hummingbird (Selasphorus rufus)	S	C	O	O	U	U	U	U	U	U	O	U			
Calliope Hummingbird (Stellula calliope)	S	R	U	U						U	U	U			
Belted Kingfisher (Megaceryle alycon)	P	C							U	O		O	U		
Common Flicker (Colaptes auratus)	P	C	U	U	U	U	U	U	U	U	U	U	O	U	
Pileated Woodpecker (Dryocopus pileatus)	P	U					O	O	U	U			O		
Acorn Woodpecker (Melanerpes formicivorus)	P	R							O	U			O		
Lewis' Woodpecker (Melanerpes lewis)	P	U	U	U	U	U	U	U	U	U	U		O		
Yellow-bellied Sapsucker (Sphyrapicus varius)	P	U		U	U	U	O	O	U	O		U	O		
Hairy Woodpecker (Picoides villosus)	P	U		U	U	U	O	O	U	U		U	O		
Downy Woodpecker (Picoides pubescens)	P	C		U	U	U	U	U	O	O		O	O		
Black-backed Three-toed Woodpecker (Picoides articus)	P	R				U	U	U		U		U	O		
Eastern Kingbird (Tyrannus tyrannus)	S	O	U	U	U					U	U	U			
Western Kingbird (Tyrannus verticalis)	S	O	U	U	U				U	U	U	U		U	
Say's Phoebe (Sayornis saya)	P	R	U	U	U				U	U	U	U		U	
Willow Flycatcher (Empidonax traillii)	S	U		U	U				U	O		O			
Hammond's Flycatcher (Empidonax hammondii)	S	U				U	U	O	U	U	U	U	U		U
Western Flycatcher (Empidonax difficilis)	S	U				U	O	O	U	O		O			
Western Wood Pewee (Contopus sordidulus)	S	C			U	U	U	U	U	U		U			
Olive-sided Flycatcher (Nuttallornia borealis)	S	C	U	U	U	U	U	U	U	U		U	U		
Horned Lark (Eremophila alpestris)	P	U	U								U				

Appendix E WILDLIFE SPECIES & HABITAT USE

			Habitat Use												
			Conifer Habitat						Other Habitat						
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Violet-green Swallow (Tachycineta thalassina)	S	C	U	U	U	U	U	U	U	U	U	U	O	U	
Tree Swallow (Iridoprocne bicolor)	S	C	U	U			O	O	U	U	U	U	O		
Bank Swallow (Riparia riparia)	S	O	U	U					U	O		O			
Rough-winged Swallow (Stelgidopteryx ruficollis)	S	R	U	U					U	O		O		O	
Barn Swallow (Hirundo rustica)	S	C	U	U					U	O	U	O		U	U
Cliff Swallow (Petrochelidon pyrrhonota)	S	C	U	U					U	U	U	U		O	
Purple Martin (Progne subis)	S	U	U	U			O	O	U	O		O	O		
Gray Jay (Perisoreus canadensis)	P	U			U	U	O	O	U	U		U	U		
Stellar's Jay (Cyanocitta stelleri)	P	C		U	U	U	U	U	U	U		U		U	
Scrub Jay (Aphelocoma coerulescens)	P	C		U	U	U			U	U	U	U	U		
Black-billed Magpie (Pica pica)	P	O		U	U	U				U		U			
Common Raven (Corvus corax)	P	U	U	U	U	U	O	O	U	U	U	U	U		
Common Crow (Corvus brachyrhynchos)	P	C	U	U	U	U	U	U	U	U	U	U	U		
Clark's Nutcracker (Nucifraga columbiana)	P	U			U	U	U	U					U		
Black-capped Chickadee (Parus atricapillus)	P	C		U	U	U	U	U	O	O		U	O		
Mountain Chickadee (Parus gambeli)	P	R			U	U	U	U	U	U		U	O		
Chestnut-backed Chickadee (Parus rufescens)	P	C			U	U	O	O	U	U		U	O		
Bushtit (Psaltriparus minimus)	P	C		U	U	U			U	U		U			
White-breasted Nuthatch (Sitta carolinensis)	P	U		U	U	U	U	U	U	U		U	O		
Red-breasted Nuthatch (Sitta canadensis)	P	U			U	U	O	O	U	U			O		
Brown Creeper (Certhia familiaris)	P	U				U	O	O	U	U			O		
Wrentit (Chamaea fasciata)	P	U		O	U					U		U			
Dipper (Cinclus mexicanus)	P	U							U	O		O			
House Wren (Troglodytes aedon)	S	U		U	U	U			U	U		U	O		
Winter Wren (Troglodytes troglodytes)	P	C		U	U	U	O	O	U	O		U			
Bewick's Wren (Thryomanes bewickii)	P	C			U	U	U	U	U	U		U	U		
Long-billed Marsh Wren (Cistothorus palustris)	P	U								O		O			

Appendix E WILDLIFE SPECIES & HABITAT USE

	Habitat Use															
	Conifer Habitat								Other Habitat							
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Mockingbird (Mimus polyglottos)	P	O		U	U				U	U					
American Robin (Turdus migratorius)	P	C	U	U	U	U	U	U	U	U	U	U			
Varied Thrush (Ixoreus naevius)	P	C			U	U	O	O	U	U					
Hermit Thrush (Catharus guttata)	P	U			U	U	O	O	U	U		U			
Swainson's Thrush (Catharus ustulata)	S	C		U	U	U	U	U	U	O		U			
Western Bluebird (Sialia mexicana)	P	U	U	U					U		U		O		
Mountain Bluebird (Sialia currocoidea)	P	U	U	U							O		O	O	
Townsend's Solitaire (Myadestes townsendi)	P	U	U	U	U	U	U	U	U	U	U		U	U	
Golden-crowned Kinglet (Regulus satrapa)	P	C		U	U	U	O	O	U	U		U			
Ruby-crowned Kinglet (Regulus calendula)	P	U		U	U	U	O	O	U	U		U			
Water Pipit (Anthus spinoletta)	P	U								O		O			
Bohemian Waxwing (Bombycilla garrulus)	W	O		U	U	U	U		U	U		U			
Cedar Waxwing (Bombycilla cedrorum)	P	C		U	U	U	U		U	O		U			
Northern Shrike (Lanius excubitor)	W	R	U	U	U				U	U	U	U			
Loggerhead Shrike (Lanius ludovicianus)	S	R	U	U	U				U	U	U	U			
Starling (Sturnus vulgaris)	P	C	U	U						U	U	U	U	U	U
Hutton's Vireo (Vireo huttoni)	P	U		U	U	U	U	U	O	O		U			
Solitary Vireo (Vireo solitarius)	S	U			U	U	U	U	O	O	U	U			
Red-eyed Vireo (Vireo olivaceus)	S	R			U	U	U		O	O		U			
Warbling Vireo (Vireo gilvus)	S	C			U	U	U	U	O	O		U			
Orange-crowned Warbler (Vermivora celata)	S	C		U	U	U			U	U		U			
Nashville Warbler (Vermivora ruficapilla)	S	U		U	U	U			U	U		U			
Yellow Warbler (Dendroica petechia)	S	C		U	U	U	U	U	O	O		U			
Yellow-rumped Warbler (Dendroica coronata)	P	C		U	U	U	U	U	U	U		U			
Black-throated Gray Warbler (Dendroica nigrescens)	S	C		U	U	U	U	U	U	U		U			

Appendix E WILDLIFE SPECIES & HABITAT USE

			Habitat Use												
			Conifer Habitat						Other Habitat						
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Townsend's Warbler (Dendroica townsendi)	P	U				U	O	O	U	U		U			
Hermit Warbler (Dendroica occidentalis)	S	C				U	O	O	U	U		U			
MacGillivray's Warbler (Oporornis tolmiei)	S	C		U	U	U	U		U	U	U	U			
Yellowthroat (Geothlypis trichas)	S	C	U	U					U	O	U	O			
Yellow-breasted Chat (Icteria virens)	S	R		U	U	U			U	O		U			
Wilson's Warbler (Wilsonia pusilla)	S	C		U	U				U	O		O			
House Sparrow (Passer domesticus)	P	C													U
Western Meadowlark (Sturnella neglecta)	P	U	U	U							U	U			
Yellow-headed Blackbird (Xanthocephalus xanthocephalus)	S	R	U	U						O		O			
Red-winged Blackbird (Agelaius phoeniceus)	P	U	U	U					U	O		U			
Northern Oriole (Icterus galbula)	S	U	U	U					U	O		U			
Brewer's Blackbird (Euphagus cyanocephalus)	P	C	U	U	U				U	U	U	U			
Brown-headed Cowbird (Molothrus ater)	P	C	U	U	U	U			U	U	U	U			
Western Tanager (Piranga ludoviciana)	S	C			U	U	O	O	U	U		U			
Black-headed Grosbeak (Pheucticus melanocephalus)	S	C			U	U			U	O		U			
Lazuli Bunting (Passerina amoena)	S	U	U	U	U				U	U	U	U			
Evening Grosbeak (Hesperiphona vespertina)	P	C		U	U	U	O	O	U	U		U			
Purple Finch (Carpodacus purpureus)	P	C			U	U	U	U	U	U		U			
Cassin's Finch (Carpodacus cassinii)	P	R				U	U	U							
House Finch (Carpodacus mexicanus)	P	C		U	U	U			U	U		U			U
Pine Siskin (Carduelis pinus)	P	C	U	U	U	U	O	O	U	U		U			
American Goldfinch (Cardeulis tristis)	P	C	O	O	U	U			U	U	O	U			
Lesser Goldfinch (Carduelis psaltria)	P	U	O	U	U	U			U	U	O	U			
Red Crossbill (Loxia curvirostra)	P	U				U	O	O	U	U		U			
Green-tailed Towhee (Pipilo chlorura)	S	O		U	U				U	U		U			

Appendix E WILDLIFE SPECIES & HABITAT USE

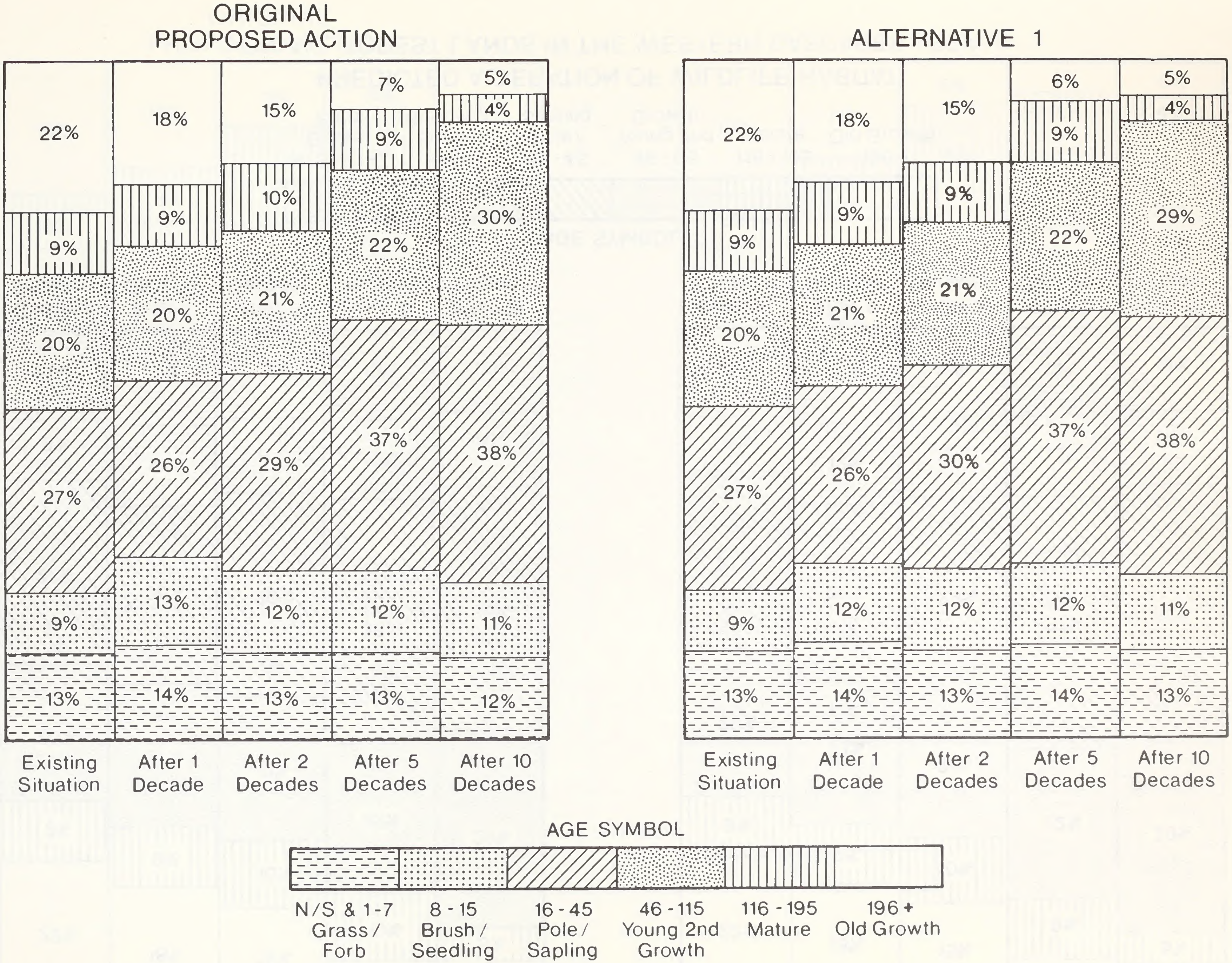
			Habitat Use												
			Conifer Habitat						Other Habitat						
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Rufous-sided Towhee (Pipilo erythrophthalmus)	P	C		U	U	U			U	U	U	U			
Savannah Sparrow (Passerculus sandwichensis)	P	C	O	U							O				
Grasshopper Sparrow (Ammodramus savannarum)	S	O	O	U							O				
Vesper Sparrow (Pooecetes gramineus)	S	R	O	U							O				
Dark-eyed Junco (Junco hyemalis)	P	C	U	U	U	U	U	U	U	U	U	U		U	
Chipping Sparrow (Spizella passerina)	S	U	U	U	U	U			U	U	U	U			
Harris' Sparrow (Zonotrichia querula)	W	R	U	U	U					U	U	U			
White-crowned Sparrow (Zonotrichia leucophrys)	P	C	O	U	U					U	O	U			
Golden-crowned Sparrow (Zonotrichia atricapilla)	W	C	O	U	U				U	U	O	U			
White-throated Sparrow (Zonotrichia albicollis)	W	R	U	U	U					U	U	U			
Fox Sparrow (Passerella iliaca)	P	C		U	U	U			U	U	U	U			
Lincoln's Sparrow (Melospiza lincolnii)	P	C		U	U				U	O		O			
Song Sparrow (Melospiza melodia)	P	C	U	U	U				U	U	U	U			
Reptiles															
Western Pond Turtle (Clemmys marmorata)	P	C								O		O			
Painted Turtle (Chrysemys picta)	P	C								O		O			
Western Fence Lizard (Sceloporus occidentalis)	P	C	O	U					U	U	O			U	
Western Skink (Eumeces skiltonianus)	P	C	O	U					U	U	O			U	
Southern Alligator Lizard (Gerrhonotus multicarinatus)	P	C	O	U					U		U			U	
Northern Alligator Lizard (Gerrhonotus coeruleus)	P	C	O	U					U		O			U	
Rubber Boa (Charina bottae)	P	C	U	U	U	U	U	U	U	U	U	U			
Ringneck Snake (Diadophis punctatus)	P	R	O	U	U	U	U	U	O	U	O	U			
Western Yellow-bellied Racer (Coluber constrictor)	P	C	O	U	U	U			U	U	O	U			
Pacific Gopher Snake (Pituophis melanoleucus)	P	C	U	U	U	U	U	U	U	U	U	U		U	
Common Garter Snake (Thamnophis sirtalis)	P	C	U	U	U	U	U	U	U	O	U	O			

Appendix E WILDLIFE SPECIES & HABITAT USE

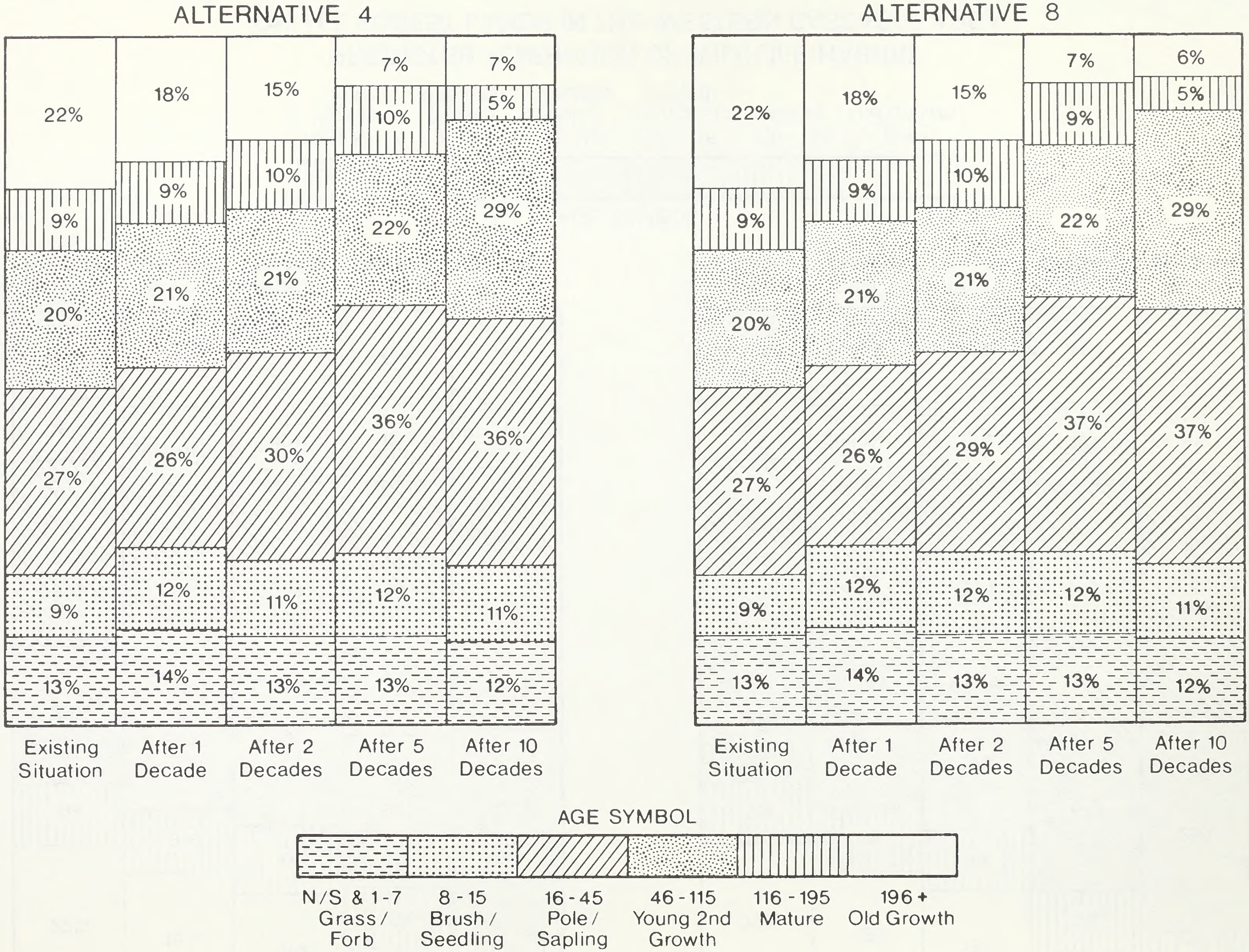
	Habitat Use														
	Conifer Habitat								Other Habitat						
	Resident	Relative Abundance	Grass/Forb	Brush/Seedling	Pole/Sapling	2nd Growth	Mature	Old Growth	Hardwood	Riparian	Dry Meadows	Wetlands	Snags	Talus Slopes /Cliffs	Other
Western Terrestrial Garter Snake (Thamnophis elegans)	P	C	U	U	U	U	U	U	U	O	U	O			
Northwestern Garter Snake (Thamophis ordinoides)	P	C	U	U	U	U			U	U	U	U			
Western Rattlesnake (Crotalus viridis)	P	U	U	U	U	U			U		U			U	
Amphibians															
Northwestern Salamander (Ambystoma gracile)	P	C	U	U		U	U	U	U	O		O			
Long-toed Salamander (Ambystoma macrodactylum)	P	C	U	U		U	U	U	U	O		O			
Pacific Giant Salamander (Dicamptodon ensatus)	P	C				U	U	O	U	O		O			
Olympic Salamander (Rhyacotriton olympicus)	P	C					U	U	U	O		O		U	
Rough-skinned Newt (Taricha granulosa)	P	C	U	U	U	U	U	U	U	O		O			
Dunn's Salamander (Plethodon dunni)	P	C					U	U	U	O		O		U	
Western Red-backed Salamander (Plethodon vehiculum)	P	C		U	U	U	U	U	U	O		O		U	
Larch Mountain Salamander (Plethodon larselli)	P	U				U	U	U	U	O		O		O	
Oregon Salamander (Ensatina eschscholtzi)	P	C		U	U	U	U	U	U	O		O			
Oregon Slender Salamander (Batrachoseps wrighti)	P	U					O	O		O		O			
Clouded Salamander (Aneides ferreus)	P	C			U	U	O	O	U	O		O			
Tailed Frog (Ascaphus truei)	P	U	U	U	U	U	O	O		O		O			
Western Toad (Bufo boreas)	P	C	U	U	U	U	U	U	U	O		O			
Pacific Tree Frog (Hyla regilla)	P	C	U	U	U	U	U	U	U	O		O		U	
Red-legged Frog (Rana aurora)	P	C	U			U	U	U	U	O		O			
Western Spotted Frog (Rana pretiosa)	P	R	U	U	U	U				O		O			
Yellow-legged Frog (Rana boylei)	P	C	U			U	U	U	U	O		O			
Bullfrog (Rana catasbeiana)	P	C	U						U	O		O			

APPENDIX F

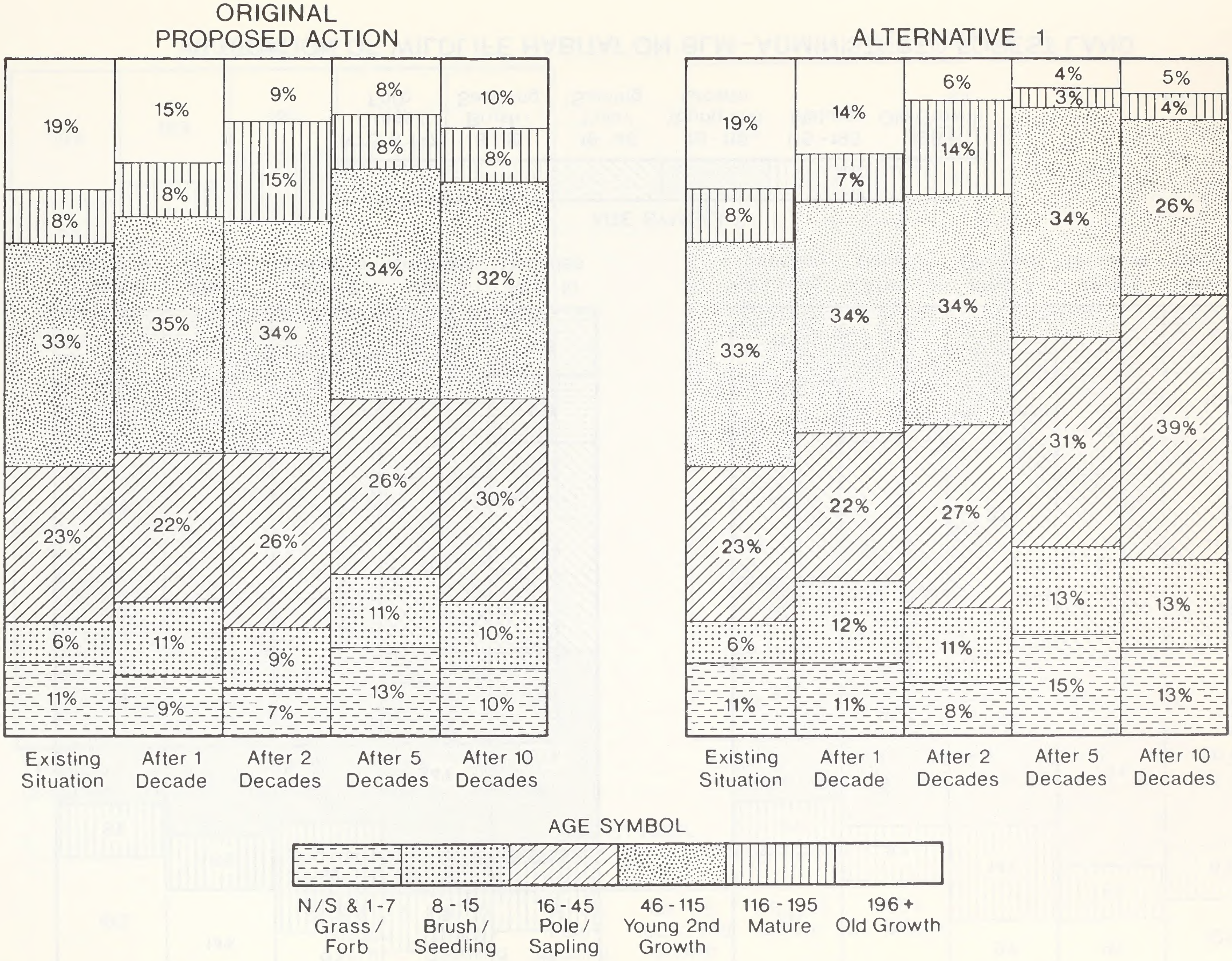
ALTERATION OF WILDLIFE HABITAT



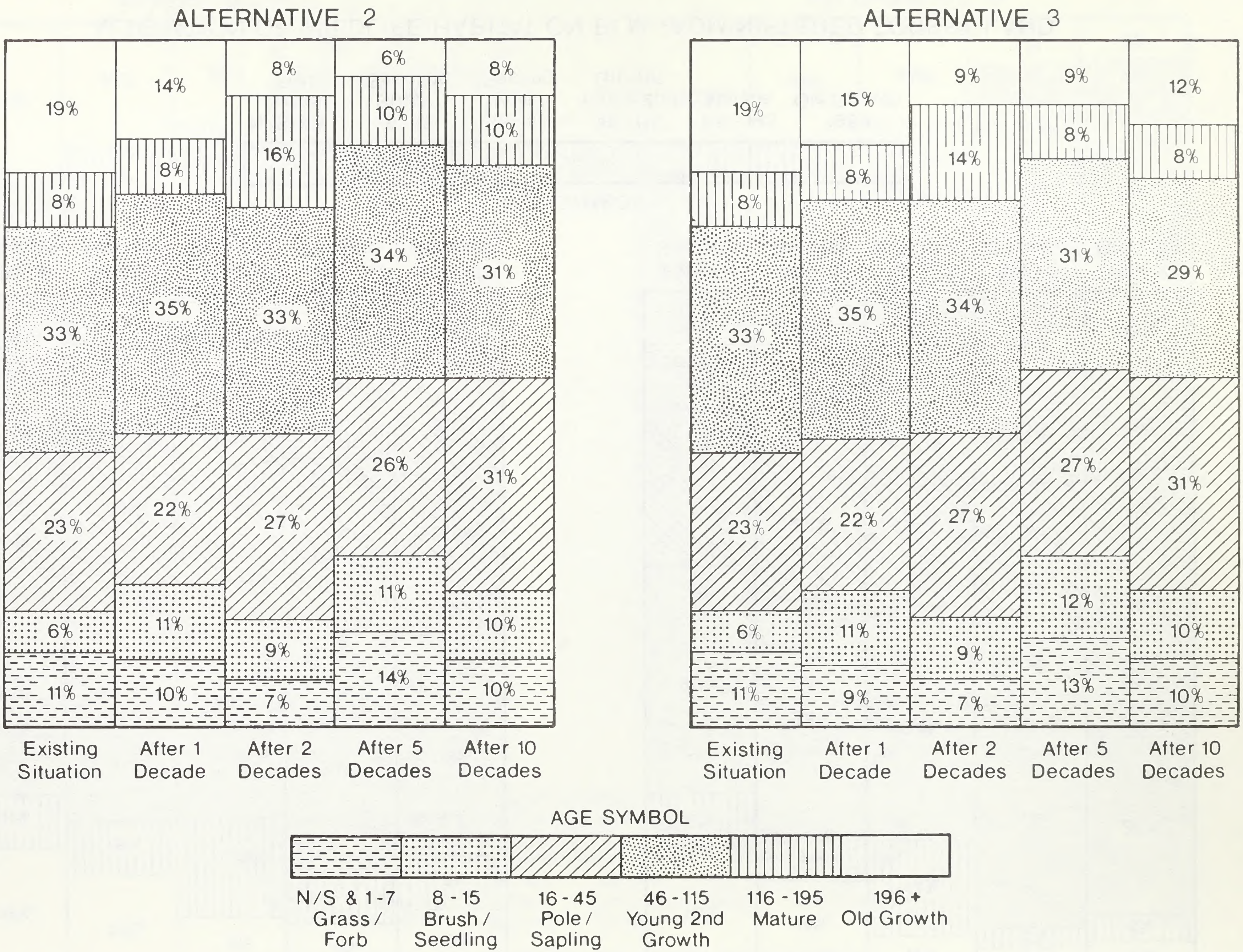
PREDICTED ALTERATION OF WILDLIFE HABITAT
ON ALL FOREST LANDS IN THE WESTERN CASCADES AREA



PREDICTED ALTERATION OF WILDLIFE HABITAT
ON ALL FOREST LANDS IN THE WESTERN CASCADES AREA



ALTERATION OF WILDLIFE HABITAT ON BLM–ADMINISTERED FOREST LAND



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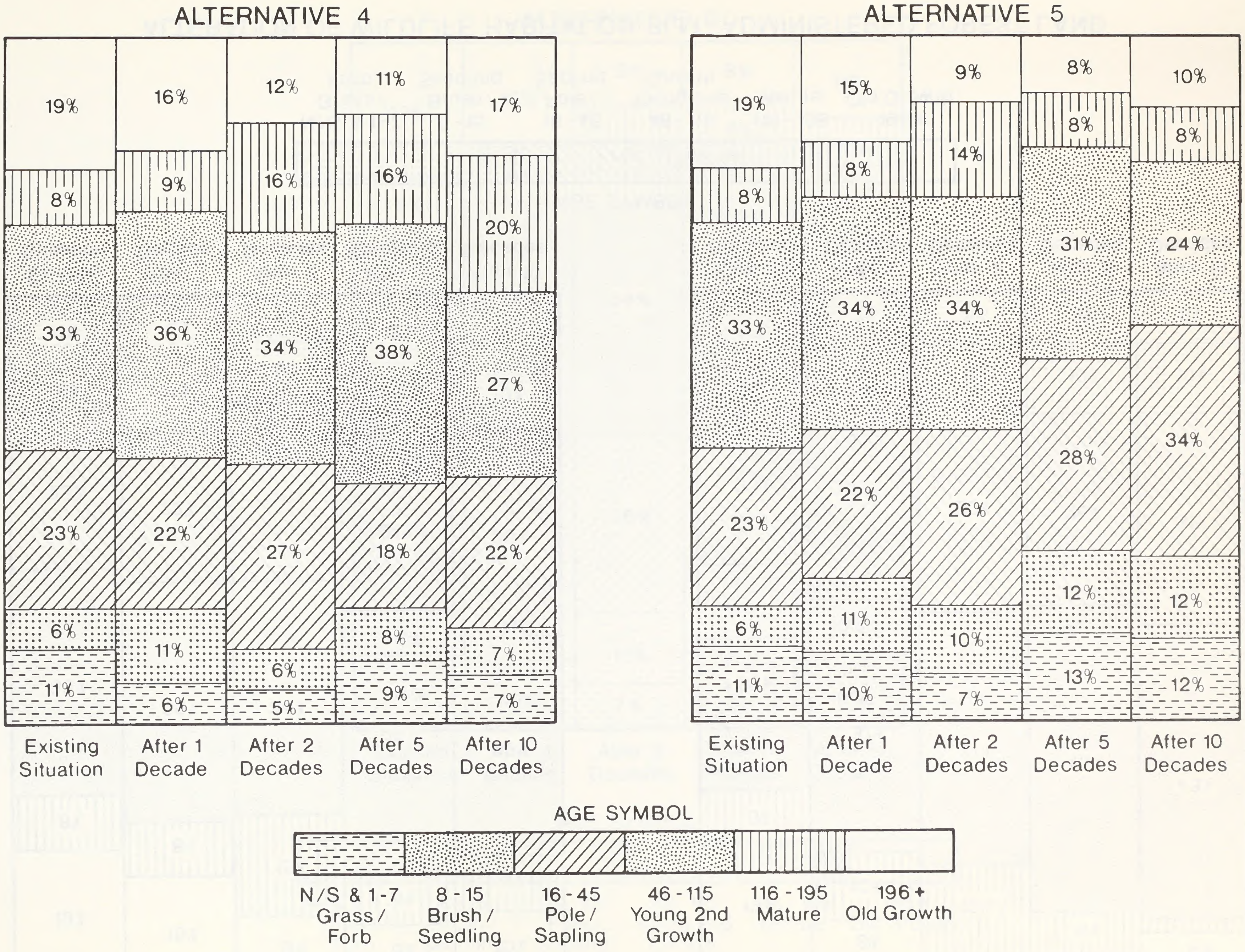

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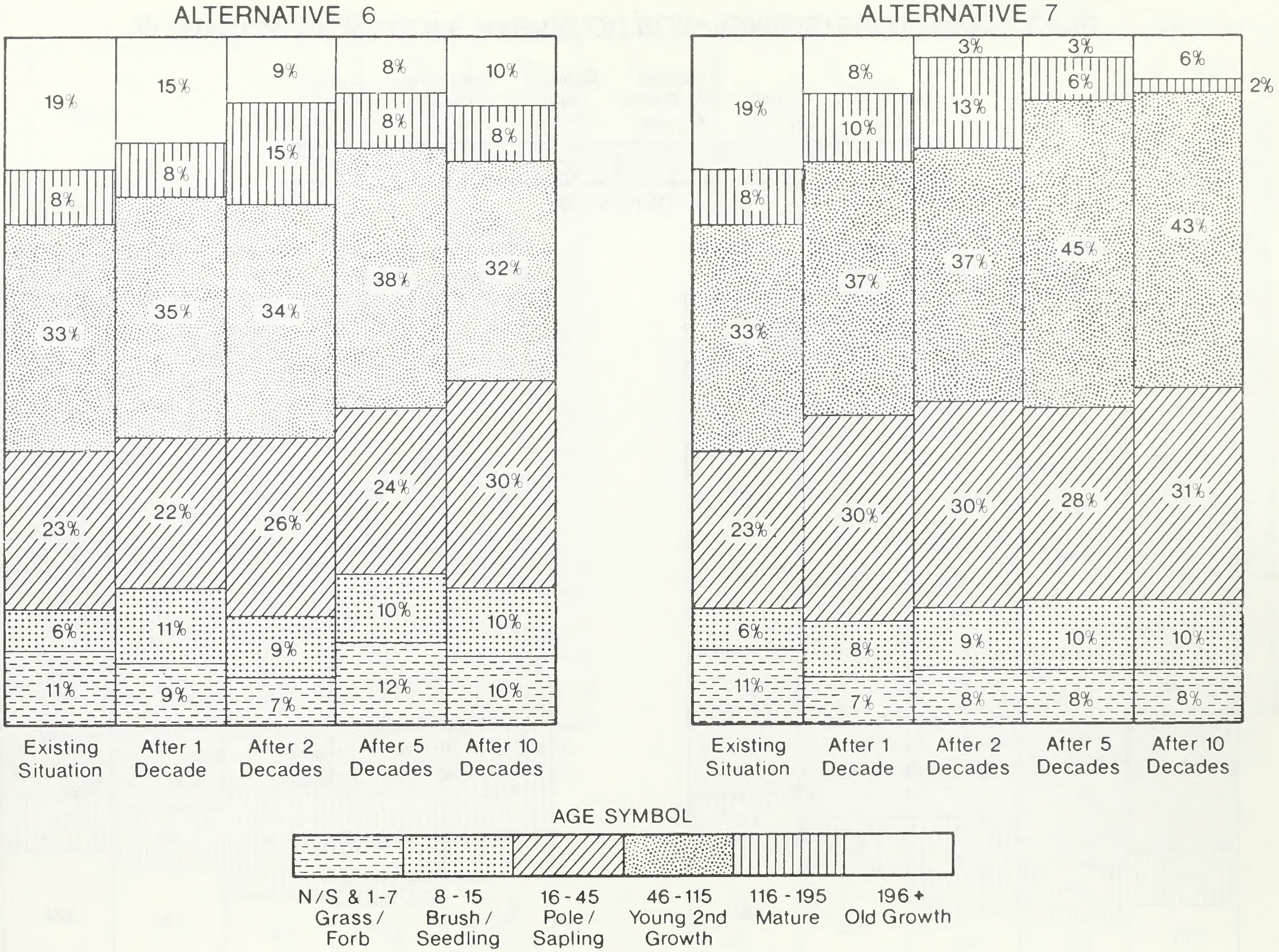
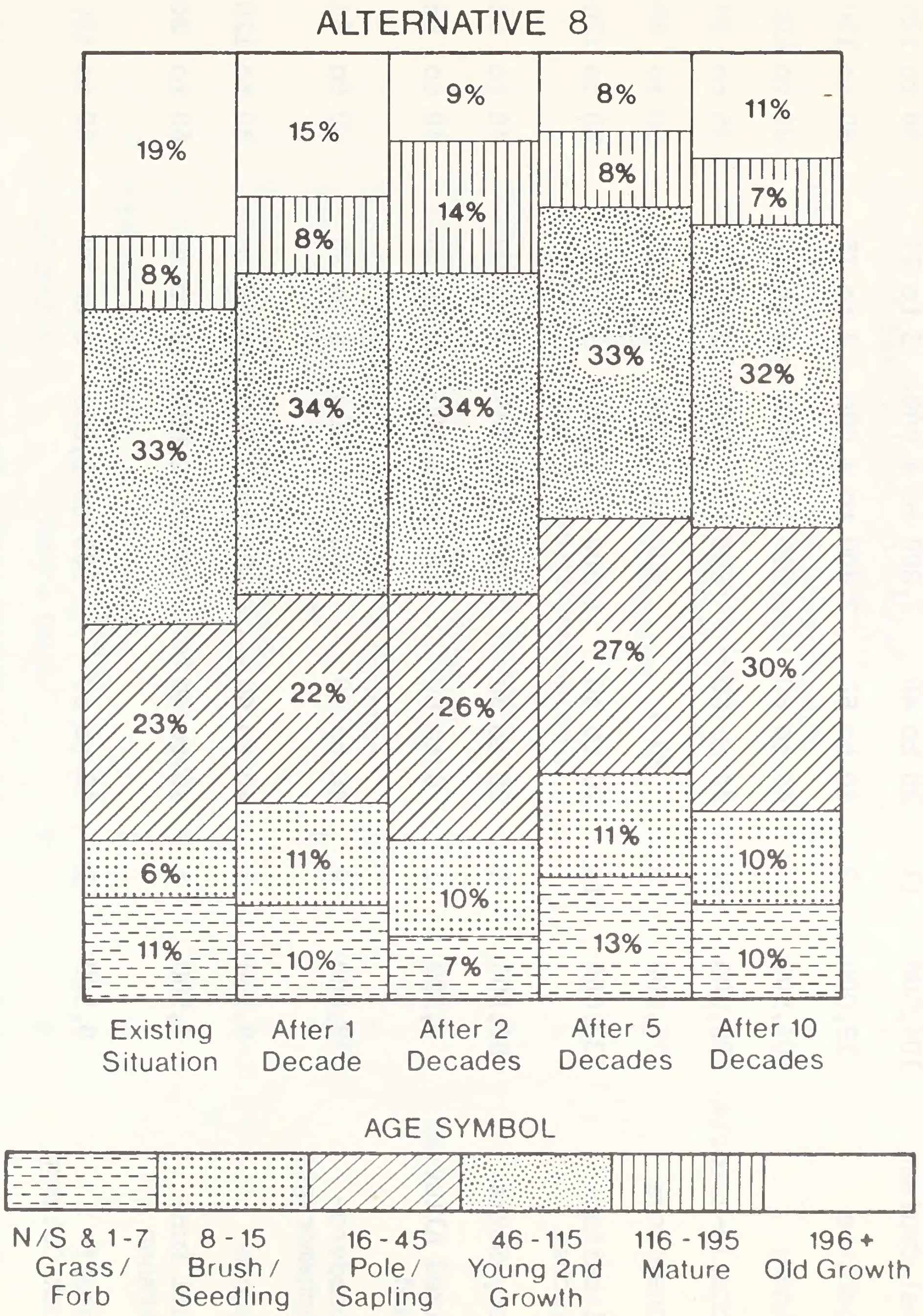


ALTERATION OF WILDLIFE HABITAT ON BLM-ADMINISTERED FOREST LAND



ALTERATION OF WILDLIFE HABITAT ON BLM-ADMINISTERED FOREST LAND

Appendix G

SOILS OF THE SYUs

Map Unit No.	Name of Association	Acres	Percent of BLM Area	Soil Depth (in.)	Elevation (ft.)	Slope (Percent)	Precipitation (in.)
1	Keel-Henline-Yellowstone	114,000	12	20 to 40	2,800 to 4,000	3 to 90	80 to 120
2	Keel-Cruiser	104,500	11	20 to 40	2,800 to 4,000+	3 to 75	80 to 120
3	Crabtree	19,000	2	40 to 60	2,800 to 4,000	2 to 75	80 to 120
4	Kinney	104,500	11	40 to 60	500 to 2,000	3 to 70	80 to 100
5	McCully-Astoria	228,000	24	40 to 60	800 to 2,000	2 to 70	55 to 80
6	Honeygrove	76,000	8	60 +	500 to 2,000	5 to 75	60 to 90
7	Klickitat-Kilches	133,000	14	20 to 40	1,500 to 2,800	3 to 90	80 to 120
8	Jory-Nekia	85,500	9	20 to 60	250 to 1,200	2 to 90	40 to 60
9	Mixed Alluvial land	9,500	1	0 to 60	100 to 2,000	0 to 10	40 to 85
10	Cozadero-Haphembrepts	38,000	4	40 to 60	600 to 900	0 to 20	60 to 85
11	Zygore	9,500	1	40 to 60	1,800 to 2,800	3 to 70	80 to 120
12	Bull Run-Mershan	9,500	1	40 to 60	500 to 2,000	3 to 70	60 to 80
13	Ashoff-Rock Outcrop	9,500	1	40 to 60	500 to 2,000	2 to 90	80 to 100
14	Crutch-Multopor	9,500	1	20 to 40	500 to 1,600	0 to 10	60 to 100

Appendix H SENSITIVE PLANT SPECIES
CURRENTLY UNDER REVIEW FOR POSSIBLE LISTING

Scientific Name	Common Name	Candidate For [1]	Observations [2]
Arnica viscosa	Shasta Arnica	E	C
Aster curtus	White-Topped Aster	E	B
Aster gormanii	Gorman's Aster	T	A
Aster vialis	Wayside Aster	E	B
Castilleja levisecta	Golden Paintbrush	E	B
Corydalis aquae-gelidae	Cold-Water Corydalis	E	B
Cypripedium californicum	California Lady's Slipper	T	C
Cypripedium montanum	Mountain Lady's Slipper	T	B
Darlingtonia californica	Pitcherplant	T	B
Delphinium leucophaeum	White Rock Larkspur	E	B
Delphinium pavonaceum	Peacock Larkspur	T	B
Erigeron decumbens var. *decumbens*	Meadow Erigeron	E	C
Erigeron howellia	Howell's Erigeron	E	B
Howellia aquatilis	Howellia	E	B
Hydrophyllum capitatum var. *thompsonii*	Ballheaded Waterleaf		C
Lathyrus holochlorus	Thin-Leaved Peavine	T	B
Lomatium bradshawii	Bradshaw's Leptotaenia	E	B
Phlox peckii	Peck's Phlox	T	C
Romanzoffia thompsonii	Thompson's Mist Maidens	E	B
Rorippa columbiae	Columbia Cress	T	C
Sidalcea campestris	Meadow Sidalcea	T	B
Sidalcea cusickii	Cusick's Checkermallow	E	B
Sidalcea nelsoniana	Nelson's Sidalcea	E	B
Sullivantia oregana	Oregon Sullivantia	T	B

[1] Threatened (T), Endangered (E), Undesignated to date (blank).

[2] Observed; on BLM - A, on other lands in the SYUs - B, Unobserved - C.

Appendix I PRIMARY CRITERIA FOR DETERMINING LEVELS OF CHANGE IN WILDLIFE HABITAT CONDITIONS DURING NEXT FIVE DECADES[1]

Habitat Type	Existing Habitat Acres	Existing Habitat Condition	Changes in Acreage and Conditions by Alternative OPA	1	2	3	4	5	6	7	8
Grass/Forb-Brush/Seedling											
Acreage	25,200		34,300	39,500	35,400	35,200	23,800	35,500	31,500	25,500	35,200
Habitat Composition		Poor	-	-	-	-	0	-	-	0	-
Habitat Distribution		Good	+	+	+	+	+	+	+	+	+
Habitat Integrity		Poor	-	--	-	-	+	-	-	--	-
Pole/Sapling - 2nd Growth											
Acreage	79,200		85,000	89,800	83,400	82,700	79,700	83,800	89,500	104,300	84,900
Habitat Composition		Good	-	-	-	-	0	-	-	--	-
Habitat Distribution		Good	+	+	+	+	+	+	+	+	+
Habitat Integrity		Poor	-	--	--	-	+	-	-	--	-
Mature											
Acreage	10,900		11,300	3,600	14,000	11,000	23,100	11,300	11,600	8,500	10,900
Habitat Composition		Good	+	--	+	+	++	+	+	-	+
Habitat Distribution		Poor	+	-	+	+	+	+	+	-	+
Habitat Integrity		Good	0	0	0	0	0	0	0	0	0
Old Growth											
Acreage	27,300		11,400	6,100	7,900	12,900	15,200	11,400	11,400	4,000	11,000
Habitat Composition		Good	-	--	--	-	-	-	-	--	-
Habitat Distribution		Poor	-	-	-	-	+	-	-	-	-
Habitat Integrity		Good	0	0	0	0	0	0	0	0	0
Hardwood											
Acreage	5,300		5,000	5,000	5,000	5,100	5,300	5,000	5,000	4,000	5,000
Habitat Composition		Poor	-	-	-	-	-	-	-	-	-
Habitat Distribution		Poor	0	0	0	0	0	0	0	0	0
Habitat Integrity		Good	0	0	0	0	0	0	0	0	0
Riparian											
Acreage	6,700		8,400	0	6,700	5,800	10,900	8,400	8,400	2,600	8,400
Habitat Composition		Poor	+	--	0	-	+	+	+	-	+
Habitat Distribution		Fair	+	--	0	-	+	+	+	--	+
Habitat Integrity		Poor	+	--	-	-	++	+	+	--	+
Habitat Diversity		Fair	0	--	-	0	+	0	0	-	-

+ = Beneficial - = Adverse 0 = None or Negligible

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[1] Predictions of forest composition in the fifth decade based upon allowable cut runs and Salem District inventory data.

Appendix J PRIMARY CRITERIA USED TO DETERMINE LEVEL OF TIMBER MANAGEMENT IMPACTS ON MAJOR RECREATION ACTIVITIES

I. Facility-Oriented

A. Camping/Picnicking Sites Subject to Timber Management

	Alternatives						
	OPA,5,6	1	2	3	4	7	8
Existing Recreation Sites (9)	0	0	0	0	0	0	0
Existing Site Buffers (9)	3[1]	7	0	3[1]	0	0	3[1]
Potential Recreation Sites (5)	3	5	0	3	0	0	4
Potential Site Buffers (5)	5[1]	5	0	5[1]	0	0	5[1]

[1] Buffers would be subject to some restricted timber harvest activities.

B. Hiking/Horse Riding Trails Subject to Timber Management

	Alternatives					
	OPA,5,6,8[1]	1[2]	2[3]	3[1]	4	7[3]
Existing Trails (5)	4	5	4	4	0	4
Existing Trail Buffers (5)	4	5	4	4	0	4
Potential Trails (4)	3	4	3	3	0	3
Potential Trail Buffers (4)	3	4	3	3	0	3

[1] Buffer widths vary. Buffers and trail treads would be subject to limited impact, e.g. road crossings.

[2] No buffers on existing trails, and treads subject to relocation as needed.

[3] Buffer widths on existing trails vary. Buffers and trail treads would be subject to relocation and restricted entry for harvesting or road construction.

C. Special Sightseeing Locations Subject to Timber Management[1]

	Alternatives					
	OPA,5,6,8	1	2	3	4	7
Sightseeing Locations (8)	1	7	1	1	0	1
Sightseeing Location Buffers (8)	1	8	2	1	0	2

[1] Does not include large, general sightseeing areas, since they would not be significantly impacted.

II. Non-Facility-Oriented

A. Hunting (big game)

Alternatives	Changes in Game Populations[1]
OPA,5,6	Moderate increase in elk numbers.
1	Major decrease in elk numbers.
2	Slight decrease in elk numbers.
3	Moderate increase in elk numbers.
4	High increase in elk numbers.
7	Major decrease in elk numbers.
8	Slight increase in elk numbers.

[1] Nominal changes in deer numbers are anticipated under the proposed action and other alternatives.

B. Fishing

Alternatives	Changes in Fish Populations
OPA,5,6,8	Moderate increase in fish numbers.
1	Major decrease in fish numbers.
2	Negligible change in fish numbers.
3	Slight increase in fish numbers.
4	High increase in fish numbers.
7	Negligible change in fish numbers.

C. ORV Driving and Other[1]

Alternatives	Timber Management Impact Factor
OPA,5,6	96 miles new road construction.
1	104 " " " "
2	97 " " " "
3	93 " " " "
4	86 " " " "
7	101 " " " "
8	91 " " " "

[1] "Other" includes dispersed activities such as collecting, camping, picnicking, upland game hunting and general sightseeing.

Appendix K
PRIMARY CRITERIA USED TO DETERMINE PROBABLE CHANGES IN POTENTIAL ACECs

Potential ACECs	Alternative	Probable Activities	Major Consequences
Columbia River Gorge, Sandy River Gorge and Middle Santiam Terrace	1	Intensive timber management (ITM)[1] on all tracts.	Loss of sensitive plant species, scenic values.
	OPA, 2-7,8	None	Protection of sensitive plant species, scenic values.
Williams Lake	1,7	ITM to lake's edge.	Loss of sensitive plant species.
	2	Road construction and salvage logging in buffer zone.	Alteration of water supply to lake. Damage to sensitive plant species.
	3,4	None.	Protection of sensitive plant species.
	OPA, 5,6,8	ITM (10 percent removal per decade) in buffer zone.	Damage to portions of sensitive plant habitat.
Soosap Meadows	1	ITM throughout area.	Loss of sensitive plant species, scenic values.
	2	Road construction and salvage logging in buffer zone.	Modification of micro-habitat, possible damage to plant vitality (see Glossary), scenic values.
	3,4	None.	Protection of sensitive plant species, scenic values.
	OPA, 5,6,8	ITM (10 percent removal per decade) in buffer zone.	Modification of natural vegetation within buffers, possible damage to sensitive plant habitat, scenic values.
	7	ITM up to meadow edge.	Modification of natural vegetation surrounding meadow, probable damage to sensitive plant habitat, scenic values.

[1] Intensive timber management (ITM) includes road construction.

Appendix K
PRIMARY CRITERIA USED TO DETERMINE PROBABLE CHANGES IN POTENTIAL ACECs

Potential ACEC	Alternative	Probable Activities	Major Consequences
Table Rock	1	ITM[1] throughout area.	Loss of sensitive plant habitat, scenic and cultural values.
	OPA, 5,6,8	ITM (10 percent removal per decade) in buffer zone.	Potential change in plant species and/or species competition.
	2,7	ITM in buffer zone.	Modification of natural vegetation within buffer, possible damage to sensitive plant habitat, scenic values.
	3	ITM (5 percent removal per decade) in buffer zone.	Potential change in plant species and/or species competition.
	4	None.	Protection of sensitive plant habitat, scenic and cultural values.
Carolyn's Crown	1	ITM throughout area.	Loss of sensitive plant habitat and surrounding vegetation.
	OPA, 2-6,8	None.	Protection of sensitive plant habitat.
	7	ITM throughout area except in riparian zones.	Loss of sensitive plant habitat, potential indirect damage to riparian zones.

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[1] Intensive timber management (ITM) includes road construction.

Appendix L

ANALYSIS OF ALTERNATIVE 5

Alternative 5 was designed to address two questions growing out of the Eastside Scoping process:

1. How would the Clackamas-Molalla SYU react to a deviation from the Bureau's non-declining even-flow policy? The supposition here is that there could be short-term and/or long-term increases in harvest.

2. To what extent could harvest from the Santiam SYU be increased by lowering the minimum harvest age below the 60-year age class included in the original proposed action?

A comparison between Alternative 5 and the original proposed action discloses several trade-offs between short-term use and long-term productivity. Due to differences between the two SYUs, trade-offs for each will be discussed separately.

Clackamas-Molalla SYU

Under Alternative 5, harvest over the short term (first 10 years) would be 61 MM bd. ft. (6.1 MM bd. ft./year) above that of the original proposed action (see Figure L-1). For the following two decades the harvest would be reduced to 39.3 MM bd. ft. annually (1.0 MM bd. ft./year below that of the original proposed action).

Beginning with the fourth decade, harvest would equal that of the original proposed action (40.3 MM bd. ft./year).

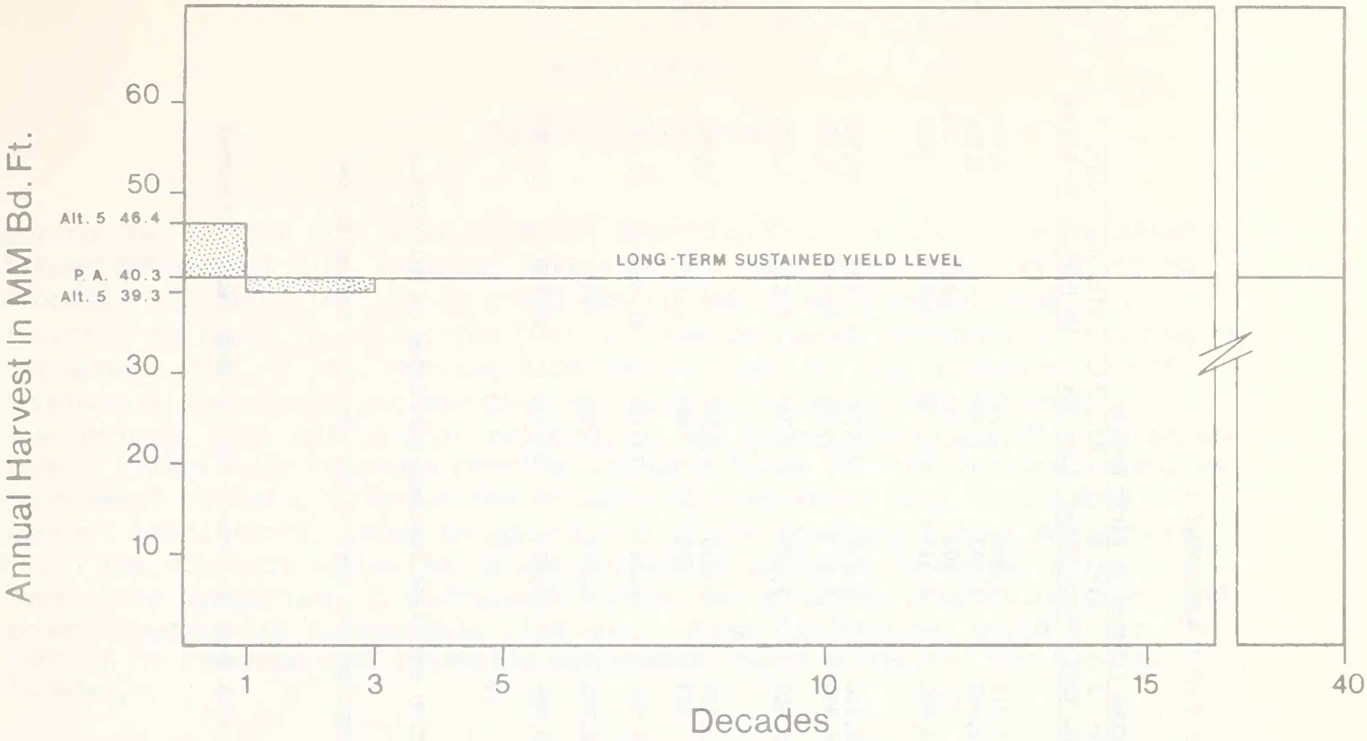
The even-flow harvest level calculated for the original proposed action is at the maximum long-term sustained yield level. A continuation of this harvest level would result in a regulated forest with a near perfect distribution of age classes and final harvest acreage for over half of the 40-decade projection period (decades 18-40). The first decade harvest under Alternative 5 would exceed this maximum sustainable harvest by 6.1 MM bd. ft. annually. Although exceeding the maximum sustainable harvest would violate current BLM policy, it would not affect the time required to achieve forest regulation, nor would it reduce the minimum harvest age below 60 years. By the time both alternatives are harvesting at the long-term sustained yield level (three decades), Alternative 5 would produce a total of 41 MM bd. ft. more than the original proposed action.

It is apparent from this analysis that the long-term productivity of the SYU would not be affected by moderate fluctuations in harvest. This can be attributed primarily to two factors: First, the initial age class distribution contains acres in most age classes from non-stocked to 200 years with approximately 40 percent of the SYU between 100 and 200 years of age. This distribution would assure a continuous flow of harvestable age timber over the entire 40-decade projection period. Secondly, the minimum age for final harvest is 60 years. This is a favorable situation, as it is only slightly younger than the age at which maximum annual sustainable harvest is reached (75 years).

Santiam SYU

Under Alternative 5, harvest over the short term would be 21 MM bd. ft. (2.1 MM bd. ft./year) above that of the original proposed action. However, long-term productivity would be sacrificed. Maximum growth (occurring at the long-term sustained yield level) would be an estimated 59.6 MM bd. ft. annually. As illustrated in Figure L-1, Alternative 5 would produce a total of 294 MM bd. ft. more than the original proposed action until the 14th decade when the proposed action would achieve regulation. During the 14th through 40th decades, the original proposed action would produce a total of 1,104 MM bd. ft. more than Alternative 5, which would achieve regulation around the 40th decade. Therefore, over the long term (40-decade projection period), the original proposed action would produce 810 MM bd. ft. more than Alternative 5. The lengthy period of time required to achieve regulation under Alternative 5 can be attributed to two factors: First, the SYU contains large acreages in the 0-40 and 200+ age classes but is deficient in the middle age classes. The full impact of this situation would occur in the sixth decade when young stands (40 and 50 years) would begin to be scheduled for final harvest to bridge the supply gap. Secondly, the higher harvest level, a result of lowering the minimum final harvest age from 60 years in the original proposed action to 50 years, would drive the harvest down into stands much younger than the age at which maximum annual sustainable harvest is reached (80 years). Harvesting in these younger, lower- volume stands would start early in the projection period (sixth decade). As a result, large final harvest acreages would be generated early. The remainder of the 40-decade period would be required for the SYU stand to grow back to the point where final harvest would occur at or near the age of maximum growth.

ALTERNATIVE 5 vs ORIGINAL PROPOSED ACTION
Clackamas-Molalla SYU



ALTERNATIVE 5 vs ORIGINAL PROPOSED ACTION
Santiam SYU

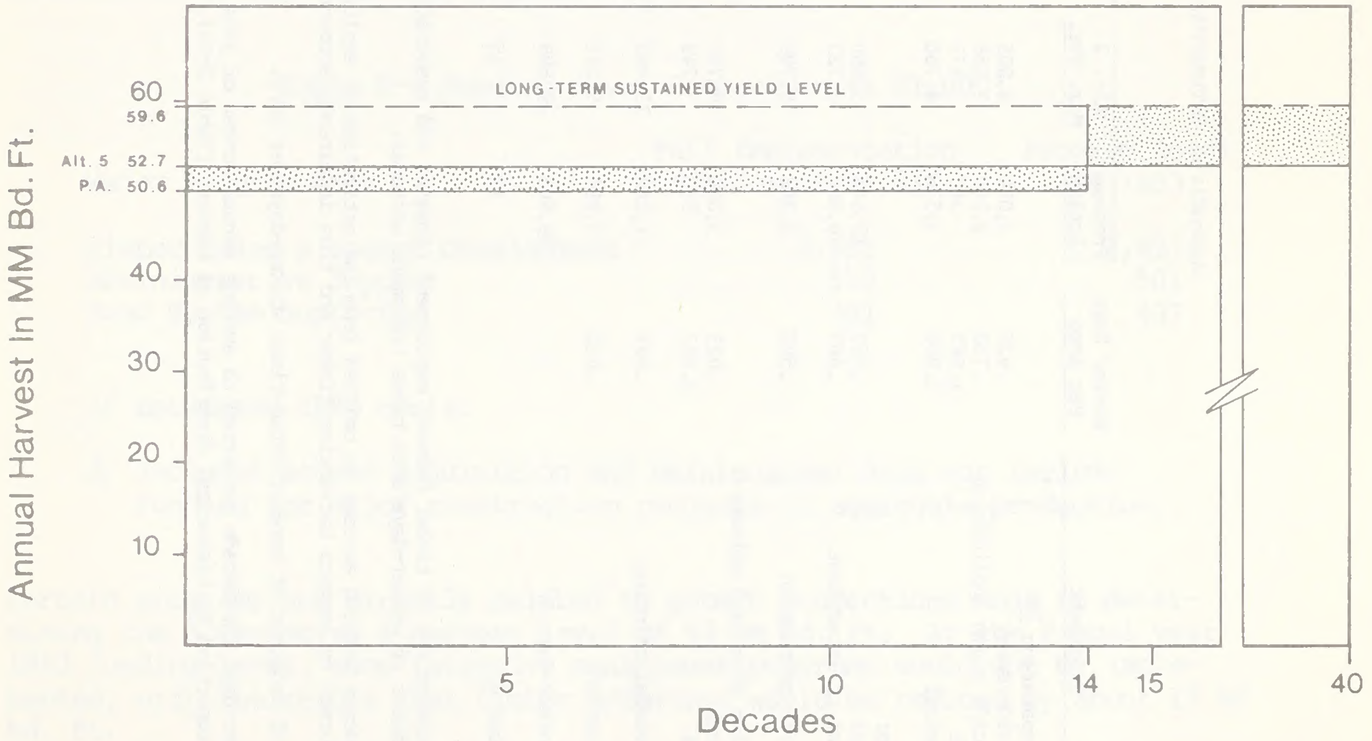


FIGURE L-1

ANALYSIS OF ALTERNATIVE 5

Appendix M ESTIMATION OF EMPLOYMENT IN FOREST MANAGEMENT 1/

Treatment	Worker Days Per Acre	Number of acres treated in first decade								
		Proposed Action	Alt. 1 Max. Tbr.	Alt. 2 Emp. Tbr.	Alt. 3 Mod. Tbr.	Alt. 4 Emp. Other	Alt. 5 Acc. Tbr.	Alt. 6 No Herb.	Alt. 7 No Action	Alt. 8 NPA
Site preparation 2/										
Herbicide spray	.025	3,050	4,006	3,160	3,015	1,948	3,323	-	1,968	1,450
Herbicide stump application	.750	2,000	2,658	2,074	2,007	1,332	2,188	-	1,969	950
Manual	1.667	367	471	399	373	205	391	2,041	234	1,100
Mechanical	1.000	3,578	4,760	3,765	3,662	2,513	3,910	3,454	3,237	4,500
Planting:										
Initial	.667	12,544	15,860	13,124	12,716	8,438	13,782	11,997	11,918	12,896
Replant or interplant	.667	6,900	8,723	7,218	6,994	4,641	7,580	6,598	6,555	7,093
Plantation protection	.500	4,362	5,799	4,602	4,402	2,825	4,761	4,212	1,864	4,603
Plantation mtnc. and release										
Chemical	.025	5,000	6,750	5,200	5,100	3,450	5,500	-	4,900	4,700
Manual	1.667	553	749	581	567	385	609	2,199	546	1,500
Precommercial thinning	.667	11,162	13,498	11,623	12,599	8,243	11,162	11,162	13,079	9,350
Fertilization	.025	7,984	9,282	8,064	8,702	6,418	7,984	7,984	-	7,276
Total worker-days 3/		29,608	37,588	30,986	30,906	20,425	31,712	32,676	28,163	32,811
Total jobs 4/		12	15	12	12	8	13	13	11	11

1/ Employment net of timber harvest employment (logging and associated road construction and slash burning) calculated by multiplying estimates of worker-days/acre times treatment acreages.

2/ Broadcast burning acreage is omitted from the estimation of employment on the assumption that most of the clearcut burning is now performed by loggers harvesting timber and thus is already accounted for.

3/ Sum of products of acres treated times worker-days per acre.

4/ Worker-days for decade converted to average annual number of jobs on basis of 250 work days per year. Jobs in each county estimated in proportion to historical distribution of harvest (Table 2-16).

Appendix N

ECONOMIC EFFICIENCY

During the various public involvement opportunities for the Eastside Salem Timber Management EIS, requests were made for more information relating to economic efficiency of the proposed action and other alternatives. In response to these requests, the District has prepared information relating to the annual cost of implementing Alternative 8 and to the intensive forest management investment regimes that are most efficient under alternative assumptions. For information relating to the longer-term cash flow balances (could timber sale revenues provide adequate funds for the assumed intensive management regime throughout the decades of transition to a "regulated forest" condition?), refer to Appendix B of the Roseburg Timber Management EIS. The Roseburg situation is not identical to Eastside Salem, which has a much lower proportion of old-growth timber and a higher proportion of second growth approaching harvestable size/age. These differences would alter the pattern of revenues and intensive management costs projected for future decades.

Cost of Implementation

Table N-1 shows the approximate average annual cost of implementing Alternative 8 for the first decade. Only timber management and related support programs are shown. The average annual cost to implement the new preferred alternative is approximately $3,662,000.

Table N-1 Funding Level Comparison (x $1,000)

Major Program Area	Full Implementation of Alternative 8[1]	Program Level FY 1983
Timber Sales & Forest Development	2,631	1,897
Administrative Support	550	501
Road System Support[2]	481	437

[1] Estimated 1984 costs.

[2] Includes access acquisition and maintenance; does not include funding for major construction projects or aggregate production.

Certain programs are directly related to growth projections made in determining the Alternative 8 harvest level of 93 MM bd. ft. At the fiscal year 1983 funding level, some intensive management programs would not be implemented, with the result that timber offerings would be reduced by about 19 MM bd. ft.

Efficiency of Forest Management Practices

Commercial forest land in the Eastside Salem SYUs is managed under the principle of sustained yield. The thrust of the District's forestry program is to achieve economic and silvicultural efficiency and environmental protection consistent with a high level of annual or regular periodic output of timber. The District has developed a forestry program for its Management Framework Plan (MFP). Among other goals, the selected forestry management program targets a package of management practices which ultimately would be applied to most acres on the District's commercial forest land. Practices chosen by the District include tree improvement through genetic selection, spacing management (precommercial and commercial thinning) and fertilization. This was the set of practices which the District found to be technically and environmentally feasible. This section contrasts the economic efficiency of practices under several possible management options.

As the ratio of mature to immature timber declines, the significance of an allowable cut effect dwindles. The District's target is a management regime (standard set of intensive practices) which is economically efficient both now and in future decades when there is no allowable cut effect. The District analyzed packages of practices by soil expectation value per acre, where soil expectation value is defined to be the value, today, of planned investments on a nonstocked acre and of maintaining that program throughout the future. For comparability, each complement of practices is applied to average site conditions in the Eastside Salem SYUs. (The BLM's harvest scheduling model is based on average site conditions in each SYU). Soil expectation values are compared using discount factors of 4 percent, 7.625 percent and 10 percent per year. The 4 percent rate is the factor by which the U.S. Forest Service discounts future returns and costs of forest management to determine the present value of future returns in today's dollars. The alternative assumption of an increase of 1.65 percent per year faster than general inflation for 50 years is also derived from USFS interpretations (Haynes et al. 1980).

Table N-2 summarizes the District's findings. Arrayed are packages of practices which maximize soil expectation value at various discount rates and possible levels of price appreciation.

Table N-2

Package of Practices Which Maximize the Soil Expectation Value of Salem District Acres Reforested 1984-1993 at Various Discount Rates and Levels of Price

Timber Value	SYU	4 Percent	7.625 Percent	10 Percent
FY 81 Sales Value of $310/MBF and no real price appreciation	Clackamas-Molalla	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 65	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 45	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 45
	Santiam River	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 65	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 45	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 45
FY 81 Sales Value of $310/MBF and 1.65 percent annual price appreciation 1980-2030	Clackamas-Molalla	Plant Improved Stock, Pre-Commercially Thin, and Commercially Thin, Fertilize and Final Harvest @ 65	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 45	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 45
	Santiam River	Plant Improved Stock, Pre-Commercially Thin, and Commercially Thin, Fertilize and Final Harvest @ 65	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 45	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 45
FY 82 Sales Value of $104/MBF and no real price appreciation	Clackamas-Molalla	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 85	Plant Improved Stock, Final Harvest @ 90	Plant Improved Stock, Final Harvest @ 90
	Santiam River	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 85	Plant Improved Stock, Final Harvest @ 90	Plant Improved Stock, Final Harvest @ 90
FY 82 Sales Value of $104/MBF and 1.65 percent annual price appreciation 1980-2030	Clackamas-Molalla	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 65	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 55	Plant Improved Stock, Final Harvest @ 60
	Santiam River	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 65	Plant Improved Stock, Pre-Commercially Thin, Final Harvest @ 55	Plant Improved Stock, Final Harvest @ 60

Appendix O

ANALYSIS OF COMMERCIAL FOREST LAND ALLOCATIONS AND POSSIBLE BENEFITS FORGONE IN NEW PREFERRED ALTERNATIVE

LAND USE CATEGORY	LAND CONSTRAINED OR NO HARVEST (Acres)	ANNUAL HARVEST (MMBF)	LOCAL JOBS (#)	PERSONAL INCOME ($1,000)	O&C COUNTY INCOME ($1,000)
VRM	4,111	0.7	18	244	76
Recreation Sites	500	0.5	15	203	63
Mid-age and Old-growth Forest	8,677	8.9	269	3,618	1,129
Riparian Zones	5,514	5.7	172	2,317	723
Miscellaneous (Cultural, ACEC, etc.)	4,550	1.5	68	610	190
TOTALS	23,352	17.3	542	6,992	2,181

Appendix P

THE SERAL STAGE DISTRIBUTION CONCEPT

Background

The mid-age and old-growth stands remaining today are the result of complex interactions between plants and animals over time. Evidence points towards the simultaneous evolution of these plants and animals. Yet, the exact functioning and purpose of many of these interactions have not yet been studied in depth. For example, the mechanisms for nitrogen fixation have only been identified within the past decade. Additionally, there are indications that mycorrhizal inoculation by rodents may be critical to plantation establishment and survival in some instances (Franklin et al. 1981). There are many unknowns regarding which portions of this interacting web, if any, must be replicated by management if long-term timber production is to be maintained at high levels. What is known, however, is that the timber management program would liquidate the remaining old-growth stands in a relatively short time if unconstrained.

Specific Criteria for Implementing Seral Stage Distribution in Western Oregon

1. Each district is to identify one large block of mid-age and/or old-growth timber, preferrably on a 50 percent-50 percent basis, 300 to 500 acres in size, in each seed zone within each 500' elevational band.

   Seed zones are accepted as generally encompassing a geographic area within which the factors affecting reforestation and subsequent growth are relatively homogenous. They also form the best currently available geographic orientation for a system of old growth reservations. The 300- to 500-acre size is generally recognized as being adequate to maintain old-growth interior species if attention is given to configuration, probable wind firmness, etc. While a 50-50 mix of mid-age and old growth is preferred, in many cases this may not be possible, in which case preference should be given to maintaining the old-growth seral stage.

2. Each district is to identify, where possible, connecting corridors between large blocks consisting of 50- to 100-acre small blocks spaced at 1- to 1½-mile intervals containing mid-age and/or old growth on a 50-50 basis. Where a linkage via corridor is not feasible because of the isolation of a particular large block, consideration should be given to providing such isolated large blocks with a distribution of surrounding satellite small blocks.

   Small blocks are intended to prevent genetic isolation of the smaller birds and animals that may prove to be critical to long-term timber production in a particular area. The 50- to 100-acre size and the 1- to 1½-mile distribution are judgements as to what would comprise a probably effective interim measure.

Results of Applying Specific Criteria

Figure P-1 indicates the seed zones which cover the five western Oregon BLM district boundaries. Portions of 28 seed zones occur on BLM-administered lands. However, sufficient acres of old growth to meet the criteria only occur within 14 of the seed zones. Table P-1 shows the elevation intervals where large blocks have been identified in each seed zone, and the district that is expected to provide protection.

Table P-1 Tree Seed Zones by Elevation in Western Oregon

Zone	Elevation	District	Zone	Elevation	District
053	1,500 - 2,000	Salem	252	1,500 - 2,000	Salem
061	1,000 - 1,500	Salem	270	500 - 1,000	Roseburg
061	1,500 - 2,000	Salem	270	1,000 - 1,500	Roseburg
061	2,000 - 2,500	Salem	270	1,000 - 1,500	Roseburg
062	500 - 1,000	Coos Bay	270	1,500 - 2,000	Roseburg
062	500 - 1,000	Coos Bay	270	2,000 - 2,500	Roseburg
062	1,000 - 1,500	Eugene	270	2,500 - 3,000	Medford
062	1,000 - 1,500	Coos Bay	452	1,500 - 2,000	Salem
062	1,500 - 2,000	Coos Bay	452	3,000 - 3,500	Salem
071	500 - 1,000	Coos Bay	452	3,500 - 4,000	Salem
071	500 - 1,000	Coos Bay	461	1,000 - 1,500	Salem
071	1,000 - 1,500	Coos Bay	461	1,500 - 2,000	Salem
071	1,000 - 1,500	Coos Bay	461	2,000 - 2,500	Salem
071	1,500 - 2,000	Coos Bay	461	2,500 - 3,000	Salem
071	1,500 - 2,000	Coos Bay	461	3,000 - 3,500	Salem
071	2,000 - 2,500	Coos Bay	461	3,500 - 4,000	Salem
072	500 - 1,000	Coos Bay	462	1,500 - 2,000	Salem
072	500 - 1,000	Coos Bay	481	1,500 - 2,000	Eugene
072	1,000 - 1,500	Coos Bay	481	2,000 - 2,500	Eugene
072	1,000 - 1,500	Coos Bay	481	2,500 - 3,000	Eugene
072	1,500 - 2,000	Coos Bay	491	500 - 1,000	Roseburg
072	1,500 - 2,000	Coos Bay	491	1,000 - 1,500	Roseburg
072	2,000 - 2,500	Coos Bay	491	1,500 - 2,000	Roseburg
072	2,000 - 2,500	Coos Bay	491	2,000 - 2,500	Roseburg
072	2,500 - 3,000	Coos Bay	491	2,500 - 3,000	Roseburg
072	2,500 - 3,000	Coos Bay	491	3,000 - 3,500	Roseburg
251	1,500 - 2,000	Salem	491	3,500 - 4,000	Roseburg
252	500 - 1,000	Coos Bay	492	1,000 - 1,500	Roseburg
252	500 - 1,000	Roseburg	492	1,500 - 2,000	Roseburg
252	500 - 1,000	Eugene	492	2,000 - 2,500	Roseburg
252	1,000 - 1,500	Eugene	492	2,500 - 3,000	Roseburg
252	1,000 - 1,500	Eugene	492	3,000 - 3,500	Roseburg
252	1,000 - 1,500	Roseburg	492	3,500 - 4,000	Medford

GLOSSARY

GLOSSARY OF TERMS

Acre-foot - The volume of water that will cover 1 acre to a depth of 1 foot.

Active Channel - That portion of a stream channel that conveys the usual range of streamflow. Active channel is a geomorphic expression of recent discharges and is altered and shifted regularly during the normal fluctuation of streamflow.

Allele - One of a group of genes that occur at a given location on a chromosome.

Allowable Cut - The amount of timber that may be harvested annually or periodically from a specified area over a stated period in accordance with the objectives of management.

Allowable Cut Effect (ACE) - The immediate increase in today's allowable cut which is justified by expected future increases in yields due to present or proposed management treatments.

Allowable Cut Determination Process - The development and evaluation of alternative levels of timber production for the purpose of establishing an allowable cut.

Anadromous Fish - Fish which migrate from the sea to breed in fresh water. Their offspring return to the sea.

Archeological Resources - All evidences of past human occupations other than historical documents, which can be used to reconstruct the lifeways of past peoples. These include sites, artifacts, environmental data and all other relevant information. Archeological resources are also called cultural resources.

Area of Critical Environmental Concern (ACEC) - An area within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards (FLPMA Sec. 103(a)).

Aspect - The direction a slope faces.

Average Employment - The sum of number of employees, reported monthly, divided by twelve; because employment is reported for all employees working during any one month, it is a modest over-estimate of full-time equivalent employment.

Basal Area - The area of the cross-section of a tree stem near its base, generally at breast height and inclusive of bark. It is usually expressed as square feet per acre.

Biomass - The amount of living matter in a given area.

Biome - The largest land community unit (plant and animal) which is convenient to recognize.

Board Foot - A unit of solid wood, 1 foot square and 1 inch thick.

Breeding Unit - A basic physiographic unit within which seed is collected from selected trees for use in breeding programs to increase genetic gains in growth and quality.

British Thermal Unit (BTU) - A unit of heat equal to 252 calories; quantity of heat needed to raise the temperature of one pound of water from 62° F. to 63° F.

Broadcast Burning - Intentional burning in which fire is intended to spread over all of a specific area. It may or may not qualify as prescribed burning.

Bucking - Cutting trees into log lengths.

Buffer Strip - A protective area adjacent to an area requiring special attention or protection. In contrast to riparian zones which are ecological units, buffer strips can be designed to meet varying management concerns.

Bureau Planning System - A process used in the BLM to establish land use allocations, constraints and objectives for various categories of public land use.

Carcinogenic - A substance producing or inciting cancer.

Characteristic Landscape - The visual characteristics of existing landscape features (including man-made) within an area. The term does not necessarily mean naturalistic landscape character. It can refer to farmlands, timberlands or other types of landscapes.

Clearcutting - A method of timber harvesting in which all trees (merchantable or unmerchantable) are cut from an area.

Commercial Forest Land - Forest land that is now producing or is capable of producing at least 20 cubic feet per acre per year of commercial coniferous tree species.

Commercial Thinning - Intermediate cutting made in merchantable stands (30-70 years old) in order to stimulate the growth of remaining trees and increase total yield from the stand.

Community Income Effect - The sum of direct and indirect personal income generated by a change, e.g., timber harvest. Indirect personal income results from economic activity stimulated in other local enterprises by purchase of goods and services, primarily of a support nature.

Constrained Timber Production Base - Base acreage managed for timber production at a lesser intensity in consideration for other resource management objectives, i.e., minimum harvest age of 350 years for wildlife habitat (see Intensive Timber Production Base).

Critical Habitat - (1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Endangered Species Act, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) which may require special management considerations or protection, and (2) specific areas outside the geographical area occupied by the species at the time it is listed upon the determination by the Secretary that such areas are essential for the conservation of the species.

Cull - A tree or log which is rejected because it does not meet minimum merchantability specifications.

Cultural Resources - Those fragile and nonrenewable remains of human activity, occupation, or endeavor, reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features, that were of importance in human events. These resources consist of (1) physical remains, (2) areas where significant human events occurred--even though evidence of the event no longer remains, and (3) the environment immediately surrounding the actual resource. Cultural resources, including both prehistoric and historic remains, represent a part of the continuum of events from the earliest evidences of man to the present day.

Debris Avalanches - Rapid, shallow soil movements from steep hill-slopes.

Debris Torrent - A very fluid mass of soil, rock and vegetative debris that moves rapidly down steep, narrow stream channels.

Discharge - Rate of flow of a fluid, the volume of fluid passing a point per unit of time, commonly expressed as cubic feet per second (cfs), million gallons per day, gallons per minute, or cubic meters per second.

Dispersed Recreation - Pleasure-seeking activities which may occur over wide areas. Density of use is normally low and facility developments are non-existent.

Distance Zone - One of three subdivisions of a viewed area based upon the distance separating observer and observed area. The three distance zones and criteria are: (1) foreground/middle ground (primary zone)-that portion of an area being viewed which encompasses everything seen from the viewing location to a distance not exceeding 5 miles, (2) background (secondary zone)-that portion of an area being viewed which encompasses everything seen beyond the primary zone to a distance not exceeding 15 miles; and (3) seldom seen (tertiary zone)-portions of an area not seen from the viewing location to a distance not exceeding 15 miles, or areas seen beyond the 15-mile limit.

Droughty - A soil that, due to its internal characteristics, provides limited plant food and moisture.

Dry Ravelling - The downslope movement of detached soil, debris or gravel.

Ecosystem - An ecological unit consisting of both living and nonliving components which interact to produce a natural, stable system.

Educational and Scientific Study Area - Lands designated by the Salem District Office for outdoor education, research, observation and similar activities.

Environmental Assessment (EA) - A systematic environmental analysis of site-specific BLM activities used to determine whether such activities have a significant effect on the quality of the human environment and whether a formal environmental impact statement is required.

Environmental Impact Statement (EIS) - A formal document to be filed with the Environmental Protection Agency that considers significant environmental impacts expected from implementation of a major Federal action.

Erosion (soil) - Removal of soil from its place of origin to a point of deposition other than a stream channel.

Escape Cover - Generally, any vegetation, rocks or logs used by fish for security or escape from danger.

Evapotranspiration - The process which returns soil moisture to the atmosphere including evaporation and plant transpiration (uptake of soil water through roots and loss of water through leaves or needles).

Even Flow - Maintaining a relatively constant, undiminishing supply of timber from year to year for the planning cycle.

Extensive Inventory - An inventory based upon random sample plots. The forest base is separated into small groups with similar characteristics (volume, stems per acre, basal area, etc.). The total number of plots required per group is determined by stand variability and the sampling precision desired.

Fauna - All the animals in a given area.

Final Harvest Cut - Constitutes removal of a mature stand, either through clearcutting or cutting the final stage of a shelterwood regime.

Flora - All the plants in a given area.

Foliage Profile - The relationship between foliage density and height.

Forbs - Herbaceous plants; most often used pertaining to herbaceous plants eaten by wildlife.

Forest Canopy - The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Forest Land - Land that is now, or is capable of becoming, at least 10 percent stocked with forest trees and that has not been developed for nontimber use.

Forest Management Program - Includes timber activity plan and all forest resource-related program activity plans.

Forest Type Island - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement and condition to be distinguishable from vegetation on adjoining areas.

Fragile Soil - A soil that is easily damaged (i.e., resulting in reduced productivity) through natural processes or human disturbance. Fragile soils in the EIS area are on steep slopes, have thin top soils, are shallow, have high gravel contents and/or have high water tables.

Gene Pool - Composite of all genetic combinations present in a plant or animal population at a given time.

Genotype - The genetic constitution of an individual or group.

Gross Yarding - Removal from a logging unit of most large tree materials (generally all logs greater than 8 inches in diameter and at least 8 feet in length).

Growing Stock - The amount of standing, green timber retained to produce forest products; also known as forest capital.

Habitat - The environment in which an organism occurs.

Hiding Cover - Vegetation capable of hiding 90 percent of a standing adult deer or elk from the view of a human at a distance equal to or less than 61 meters (200 ft.). Generally, any vegetation used by deer or elk for security or escape from danger.

High-lead Logging - A yarding system in which logs are pulled to a landing by a cable which passes through a block hung in a tree or portable tower.

Historic Resources - All evidences of human activity that date from historic (i.e., recorded history) periods. These resources include documentary data (i.e., written records, archival material, photographs, maps, etc.), sites, artifacts, environmental data, and all other relevant information. Also included are locations where documented historical events took place, even though no physical evidence of the events remain other than the setting. Historic resources are cultural resources and may be considered archeological resources when archeological work is involved in their identification and interpretation.

Instream Structure - Boulders and large stable woody debris which create pools and trap spawning gravel. Extensively used by fish for security or escape from danger.

Intensive Forest Management Lands - All commercial forest land that is part of the timber production base for allowable cut calculation.

Intensive Timber Production Base - Base acreage intensively managed for timber production. These acres receive the greatest amount of intensive management treatment, thus producing the greatest timber yields.

Intermediate Cuttings - Any removal of merchantable trees from a stand prior to the final harvest cutting, i.e., commercial thinning, sanitation/ salvage, or shelterwood regeneration cuttings.

Landing - Any place on or adjacent to the logging site where logs are assembled for further transport.

Leach - Usually refers to the movement of chemicals through soil by water; may also refer to movement of herbicides out of leaves, stems or roots into the air or soil.

Log Flows - Destinations of harvested timber by origin. Origins used herein are management units and counties or county groupings; destinations are communities, counties or groupings of counties within which the primary processing of timber takes place.

Lumber and Wood Products, except Furniture - Defined by the Office of Management and Budget and the Standard Industrial Classification Manual as Major Group #24, which includes logging contractors engaged in cutting timber and pulpwoods; merchant sawmills, lath mills, shingle mills, planing mills, plywood mills, and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made entirely or mainly of wood or wood substitutes. Certain types of establishments producing wood products are classified elsewhere, e.g., furniture and office and store fixtures are classified in Major Group #25.

Management Framework Plan (MFP) - Land use plan for public lands which provides a set of goals, objectives and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

Mass Movement - Downslope movement of soil and rock caused by gravity; may be slow (creep) or rapid (landslide, debris avalanche).

Microclimate - The climatic condition of a small area modified from the general climatic conditions by local differences in elevation or exposure.

Minimum Harvest Age - The lowest age of a stand to be scheduled for final harvest.

Mortality Salvage - See sanitation/salvage cutting.

Multiple Use - Management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people.

Mutagen - A substance that tends to increase the frequency or extent of genetic mutations.

Mutagenesis Assay - Test to determine the extent to which a substance may cause genetic mutations (changes in hereditary material).

National Register of Historic Places - The official list, established by the Historic Preservation Act of 1966, of the nation's cultural resources worthy of preservation. The Register lists archeological, historic, and architectural properties (i.e., districts, sites, buildings, structures, and objects) nominated for their local, State, or national significance by State and/or Federal agencies and approved by the National Register staff. The Register is maintained by the National Park Service.

Natural Levels - Amount of pollutants present from natural sources without human disturbances, which have reached equilibrium.

Non-commercial Forest Land - Land which is not capable of yielding at least 20 cubic feet of wood per acre per year from commercial species, or land which is capable of producing only non-commercial tree species.

Non-forest Land - Land that has been developed for non-timber uses or land that is incapable of being 10 percent stocked with forest trees.

Non-point Source Pollution - Water quality problems caused by the introduction of materials from diffuse sources (e.g., sediment, nutrients), or from a natural or manmade alteration in the stream system.

O&C Lands - Public lands granted to the Oregon and California Railroad Company and subsequently revested to the United States.

Off-Road Vehicle (ORV) - Any motorized vehicle (except boats) designed for or capable of cross-country travel.

Old-growth Related - An animal or plant species that finds optimum habitat in old-growth forests.

Operations Inventory - An intensive forest inventory which provides such information as the location, acreage, volume and silvicultural needs, for each parcel of BLM-administered land.

Outstanding Natural Areas - Areas of outstanding scenic splendor, natural wonder or scientific importance that merit preservation in their natural condition. The preservation of these resources in their natural condition is the primary management objective. Access roads, parking areas and public use facilities are normally located on the fringe of the area. The public is encouraged to walk, rather than drive, into the area for recreation purposes wherever feasible.

Paleontology - A science dealing with the life of past geological periods as known from fossil remains.

Parent Material - The unconsolidated, chemically weathered mineral or organic matter from which soils develop.

Partial Cutting - Tree removal other than by clearcutting (see Intermediate Cuttings).

Particulates - Finely divided solid or liquid particles in the air or in an emission; includes dust, smoke fumes, mist, spray and fog.

Peak Flow - The highest amount of streamflow or riverflow occurring in a year or during a single storm event.

Personal Income - Income received by all individuals in the economy from all sources; made up of wage and salary disbursements, proprietors income, rental income of persons, dividends, personal interest income, and the difference between transfer payments and personal contributions for social insurance.

Phenotypic Variation - Variation in the visible characteristics of an organism that are produced by the interaction of the organism's genes and the environment.

Plant Community - An association of plants of various species found growing together in different areas with similar site characteristics.

Plant Vitality - The healthy life cycle of a plant community.

Plantation Maintenance - Any vegetation management action taken on an unestablished stand to promote the survival and establishment of suitable trees. Treatments may include use of biological, mechanical, or manual weeding, mulching, herbicides or a combination of methods.

Precommercial Thinning - Cuttings made in immature stands (10-25 years) in order to stimulate the growth of trees by increasing available soil moisture and nutrients. Such cuttings decrease the time needed to reach merchantable size and increase total merchantable yields from the stand.

Prehistoric - Pertaining to that period of time before written history.

Primary Excavator - An animal that digs or chips out cavities in wood to provide itself or its mate with a site for nesting or roosting.

Progeny Site - A test area for evaluating parent seed trees by comparing the performance of their offspring seedlings.

Public Lands - Any land and interest in land owned by the United States within the several States and administered by the Secretary of the Interior through the Bureau of Land Management. May include public domain, O&C or acquired lands in any combination.

Public Domain Lands - Original holdings of the United States never granted or conveyed to other jurisdictions.

Recreation Experience - The expected or desired psychological and physiological outcomes from engaging in a specific recreation activity within a specific setting.

Recreation Lands - A tract of land usually several thousand acres in size where recreation is or is expected to be a major use, and designation will assist the public by making the area known to them (CFR 43, Part 2070).

Recreation Site - A recreational development on a relatively small, distinctively defined parcel of BLM-administered land. Sites have facilities (e.g., roads, parking space, litter cans, tables, restrooms, waste water sumps, barbeque pits) designed primarily to accommodate camping and/or picnicking.

Reforestation - Reestablishment of a tree crop on forest land.

Regeneration - The renewal of a commercial tree crop, whether by natural or artificial means; also, the young crop itself.

Regeneration Cut - The first entry of a two-stage shelterwood harvest method in which 30 to 60 percent of the original stand basal area is removed.

Regeneration Period - The time it takes for a new commercial timber stand to become stocked following the date of a timber sale.

Regulated Forest - A forest comprised of a desired (usually even) distribution of age classes or tree sizes in which growth and harvest are in equilibrium (at the highest level sustainable) and the level of growing stock remains relatively constant.

Release - Any action taken on an established commercial timber stand to control stand composition and promote dominance and/or growth of suitable tree species. Treatments may include mechanical or manual slashing of undesirable brush and tree species, herbicides, biological control or a combination of methods. Forest fertilization is not considered a release treatment.

Relict - A remnant or fragment of a flora that remains from a former period when it was more widely distributed.

Research Natural Areas - Areas established and maintained for research and education. The general public may be excluded or restricted where necessary to protect studies or preserve research natural areas. Lands may have: (1) Typical or unusual faunistic or floristic types, associations, or other biotic phenomena, or (2) characteristic or outstanding geologic, pedologic or aquatic features or processes.

Riparian Habitat (Area or Zone) - Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics.

Runoff - That part of precipitation, as well as any other flow contributions, which appears in surface streams, either perennial or intermittent.

Sanitation/Salvage Cutting - Removal of individual trees killed or injured by fire, insects, disease, etc., and the removal of those trees expected to die prior to final harvest cut. This removal will recover merchantable volume which would otherwise be lost to decay.

Sawlog - A log considered suitable in size and quality for producing sawn timber.

Scenic Quality - A measure (high, moderate, low) of the aesthetic appeal of an area. Scenic quality is determined by an interdisciplinary team of evaluators using standard Bureau criteria (BLM Manual 8400).

Scribner - A log rule commonly accepted in the EIS area used to determine the board foot volume contained in a log.

Secondary Succession - An alteration of the natural plant succession of an area by fire, cultivation, logging, windthrow or any similar disturbance that destroys the principal species of an established community.

Sediment - Organic matter or soil that settles to the bottom of a liquid.

Sediment Yield - The quantity of sediment, measured in dry weight or by volume, transported in water flowing through a stream cross-section in a given time. Consists of both suspended sediment and bedload.

Sensitive Species - Species not yet officially listed but which are undergoing a status review or are proposed for listing according to Federal Register notices published by the Secretary of the Interior or Secretary of Commerce, or according to comparable State documents published by State officials. (Reference Instruction Memo W.O. 80-722).

Sensitivity Level(s) - A measure (high, medium, low) of the amount of use an area receives and of public attitudes about the visual resources of the area. Sensitivity levels are based upon standard Bureau criteria (BLM Manual 8400).

Seral (Successional) Stage - The relatively transitory plant communities within an orderly process of plant community change.

Shelterwood Cutting - A series of cuttings designed to establish a new crop of trees under the protection of the old.

Silviculture - The art of producing and tending a forest.

Site Class - A measure of an area's relative capacity for producing timber or other vegetation.

Site Preparation - Any action taken in conjunction with a reforestation effort (natural or artificial) to create an environment which is favorable for survival of suitable trees during the first growing season. This environment can be created by altering ground cover, soil or microsite conditions; using biological, mechanical, or manual clearing; prescribed burning; herbicides or a combination of methods.

Slash - The branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging has been completed.

Slump-earth flow - A slump is a rotational movement of a block of earth over a broadly concave slip surface that involves little breakup of material. An earth flow occurs when material breaks up and flows downslope.

Snag - A standing dead tree or partially dead tree from which some or all of the leaves and limbs have fallen. For management purposes, a snag is defined as any dead or partly dead tree at least 10.2 cm. (4 in.) dbh and at least 1.8 m. (6 ft.) tall.

Soil - The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants.

Soil Mapping Unit - A combination of soils or miscellaneous land type or types that can be shown at the scale of mapping for the defined purposes of a survey; the basis for the delineations of a soil survey map.

Soil Productivity - The capacity of a soil in its normal environment to produce a specified plant or sequence of plants under a specified system of management.

Standard Industrial Classification (SIC) - An industrial classification system as defined by the Office of Management and Budget; defines industries in accordance with the composition and structure of the economy and covers the entire field of economic activity. Refer to lumber and wood products for an explanation of SIC 24.

State Historic Preservation Officer (SHPO) - The official within each State, authorized by the State at the request of the Secretary of the Interior, to act as a liaison for purposes of implementing the National Historic Preservation Act of 1966.

Stocking Surveys - Examination of planting site either prior to first planting or following treatment. Survey is designed to identify any conditions which may limit the success of a reforestation project so corrective action can be taken.

Stream Order - A system of stream classification. Each small unbranched tributary is a first order stream. Two first order streams join to make a second order stream. A third order stream has only first and second order tributaries, and so forth.

Sub-biome - A subdivision of a biome (plant and animal community) containing distinctive species.

Succession - The orderly process of plant community change. Process by which one plant community will succeed another over time given the same climatic conditions.

Survival Cover - Cover required by animals to mitigate effects of a period of severe weather that cannot be met by thermal cover. The objective of retaining survival cover is to provide a forest stand structure which will intercept snow during severe storms and provide significant quantities of forage in the same stand. Stand closure should be at least 75 percent.

Suspended Sediment - Sediment suspended in a fluid by the upward components of turbulent currents or by colloidal suspension.

Sustained Yield - The yield that a forest can produce continuously at a given intensity of management.

Sustained Yield Unit - An administrative division of the EIS area for which an allowable cut is calculated.

Texture (soil) - The relative proportion of sand, silt and clay (expressed as percentages) in a soil; grouped into standard classes and subclasses in the USDA Soil Survey Manual.

Thermal Cover - Cover used by animals to ameliorate effects of weather. For elk, a stand of conifer trees which are at least 40 feet tall with an average crown closure of 70 percent or more. For deer, cover may include saplings, shrubs or trees at least 5 feet tall with 75 percent crown closure.

Tier - Using one document to provide necessary supporting information for another document in order to avoid repetition.

Tilth - The physical condition of soil relating to its ease of tillage, fitness as a seedbed and impedance to seedling emergence and root penetration.

Timberlands - See Forest Land.

Timber Production Base - Acres included in the calculation of the allowable cut (see Intensive and Constrained Timber Production Bases).

Timber Production Capability Classification (TPCC) - A classification system that identifies the commercial forest land base capable of producing timber on a sustained yield basis.

True Fir - A member of the genus *Abies*, e.g., white fir (*Abies concolor*). Douglas-fir (*Pseudotsuga menziesii*) is not a true fir.

Understory Species - Shade-tolerant plant species which characteristically grow beneath the forest canopy; e.g., blackberry and rhododendron.

Unit Resource Analysis (URA) - A BLM planning document which contains a comprehensive inventory and analysis of the resources within a specified geographic area and an analysis of their potential for development.

Visitor Day - Twelve visitor hours, which may be aggregated continuously, intermittently or simultaneously by one or more persons. Visitor days may occur either as recreation visitor days or as non-recreation visitor days.

Visual Resources - The land, water, vegetation, animals, structures and other features visible on public lands.

Visual Resource Management (VRM) - Planning, designing and implementing management activities on public lands in ways that will provide acceptable levels of visual impacts.

Visual Resource Management Classes - Numbers (I, II, III, or IV) assigned to public lands based upon scenic quality, sensitivity level and distance zone criteria. VRM classes provide objectives designed to mitigate and, in some situations, avoid adverse visual impacts. Class I (preservation) provides the highest level of protection for scenic values, and Class IV the lowest level.

Water Quality - The combined physical, chemical and biological characteristics of water bodies.

Watershed - The area drained by a given stream.

Wetland or Wetland Habitat - Permanently wet or intermittently flooded areas where the water table (fresh, saline, or brackish) is at, near, or above the soil surface for extended intervals, where hydric wet soil conditions are normally exhibited, and where depths generally do not exceed 2 meters. Vegetation is generally comprised of emergent water-loving forms (hydeophytes) which require at least a periodically saturated soil condition for growth and reproduction. In certain instances, vegetation may be completely lacking.

Withdrawals - BLM-administered lands which are not suitable or available for intensive timber management.

Yarding - The act or process of conveying logs to a landing.

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INDEX

INDEX

Page

Allowable Cut 1-3, B-1, B-5, B-6, C-4
Allowable Cut Effect B-5, B-6, B-7
Anadromous Fish 1-7, 2-14
Archeological Sites 1-11, 2-19, 3-33, 3-34
Areas of Critical Environmental Concern 1-3, 1-6, 2-23, 2-24
.... 2-25, 3-38, 3-39, B-4, K-1
Broadcast Burning 1-13, 3-11
Camping 2-17, 2-35, 3-27, 3-28, J-1
Carrying Capacity 2-14
Characteristic Landscape 2-23
Commercial Thinning 1-13, 3-17, B-5, B-6
Critical Habitat 2-17
Debris Avalanches 3-2, 3-4
Debris Torrents 3-2, 3-4
Design Features 1-10
Dissolved Oxygen 3-8, 3-9, 3-21, 3-22
Downgrading 3-33, 3-34, 3-36
Dry Ravelling 3-2, 3-4
Ecosystem Management 1-6, 1-8, D-1
Educational & Scientific Study Area 2-24
Employment 2-26, 2-27, 2-29, 2-30, 2-31, 2-33, 3-43, 3-46, 3-47
Even Flow B-5, C-2, C-3, L-1
Federal Land Policy & Management Act 1-1, 1-22
Fertilization 1-17, B-5, B-6
Fishing 2-17, 2-31, 2-35, 3-27, 3-28, 3-46, J-2
Fragile Areas 2-3, 3-5, 3-25, B-4
Genetically Improved Trees 1-15, 3-11
Habitat Composition 2-12, 2-13, 3-15, I-1
Habitat Condition 2-12, 3-14, 3-15, I-1
Habitat Distribution 2-12, 2-13, 3-14, 3-15, I-1
Habitat Integrity 2-12, 2-13, 3-15, I-1
Habitat Structure 2-12, 3-17, 3-25
Herbicides 1-13, 1-16, 2-36, 3-8, 3-12, 3-20
.... 3-23, 3-40, 3-50, C-2, C-4
Historic Sites 1-11, 2-20, 3-33, 3-34
Hunting 2-17, 2-33, 2-35, 3-27, 3-28, 3-46, J-2
Income 2-25, 2-26, 2-29, 2-30, 2-31, 2-33, 3-46, 3-47
Labor Productivity 3-43
Land Use Plan 1-1, 1-2
Monitoring 1-20
Mortality Salvage 1-12, 3-19, B-5, B-6
Multiplier Effect 2-27, 2-29, 2-30
National Register of Historic Places 2-20, 3-33, 3-34
Nutrient Depletion 3-2, 3-4
O&C Lands 1-1, 1-2
Off-Road Vehicles 2-18, 2-35, 3-27, 3-28, J-2

Old Growth 1-6, 1-7, 1-8, 1-10, 1-17, 2-10, 2-11, 2-13
.... 2-16, 3-10, 3-14, 3-15, 3-25, B-5, C-1, D-1, D-2, I-1
Operations Inventory B-1
Outstanding Natural Areas 2-18, 2-24, 3-29, C-1, C-2
Paleontological Sites 2-20
Particulates 2-2
Picnicking 2-17, 3-27, 3-28, J-1
Plant Diversity 3-11
Precommercial Thinning 1-16, 3-19, B-5, B-6
Preferred Alternative C-1, C-3, C-4
Recreation Lands 1-3, 1-6, 1-7, 2-18, 3-29, C-2
Research Natural Areas 1-7, 2-24, C-1, C-2
Revenues 2-34, 3-47
Riparian Zones 1-6, 1-7, 2-10, 2-14, 3-8, 3-15
.... 3-22, 3-23, 3-24, B-4, C-1, C-2
Scarification 1-13, 3-2, 3-20
Scenic or Recreational Rivers 1-22, 2-18, 3-29
Scenic Quality 2-20, 2-23, 3-35, 3-36, 3-38
Scoping 1-2, B-1, C-1, L-1
Secondary Succession 3-10
Sedimentation 3-6, 3-7, 3-9, 3-12, 3-22, 3-24
Sensitive Species 2-11, 3-12, K-1, K-2
Sensitivity Level (VRM) 2-20, 2-23, 3-35, 3-38
Sightseeing 2-17, 3-27, 3-28, C-1, C-2, J-1
Site Preparation 1-13, 3-11
Slash Burning 3-2, 3-4, 3-6, 3-7, 3-19, 3-25
Slump-earth Flows 3-4
Snags 1-6, 2-14, 3-15
Soil Compaction 3-2
Soil Productivity 2-4, 3-2, 3-4, 3-5
Species Composition 3-10, 3-11, 3-12
Stand Conversion 3-11, B-6
State Scenic Waterways 2-18, 2-19, 3-29
Streamflows 3-6
Sustained Yield 1-1, 1-3, B-1
Threatened & Endangered Species 1-11, 1-21, 2-11
.... 2-15, 2-16, 3-12, 3-24, B-3
Timber Production Capability Classification B-1
Trails 2-18, 3-28, 3-29, C-2, J-1
Unemployment 2-27
Upgrading 3-35, 3-36
Visitor Days 2-17
Water Quality 1-20, 1-25, 2-9, 3-7, 3-23
Water Yield 3-6
Wetlands 2-11, 3-12
Wilderness 2-23, 3-1

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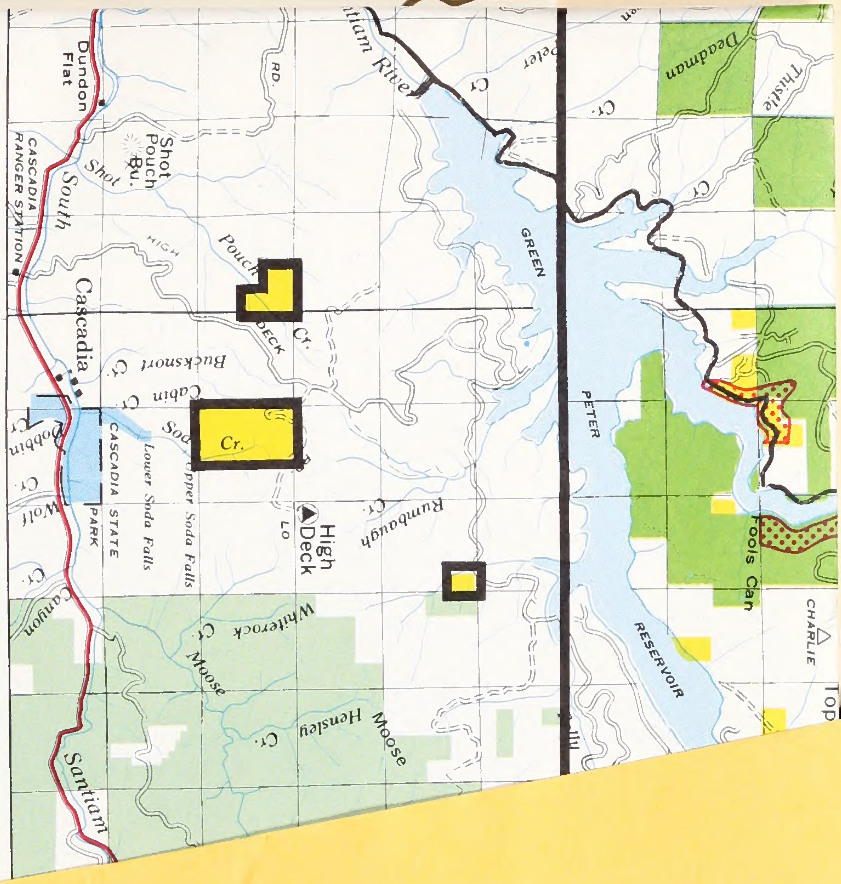

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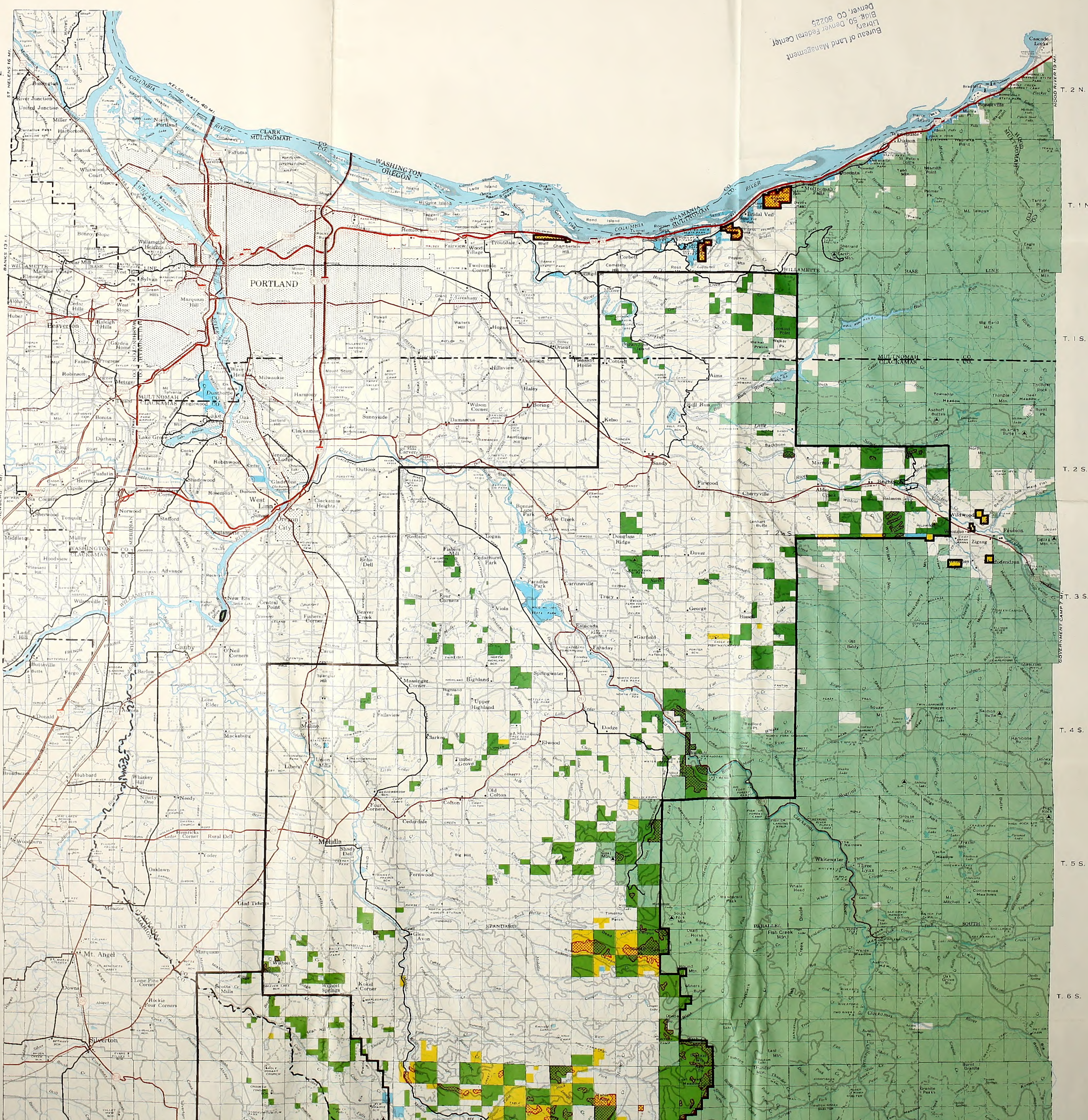

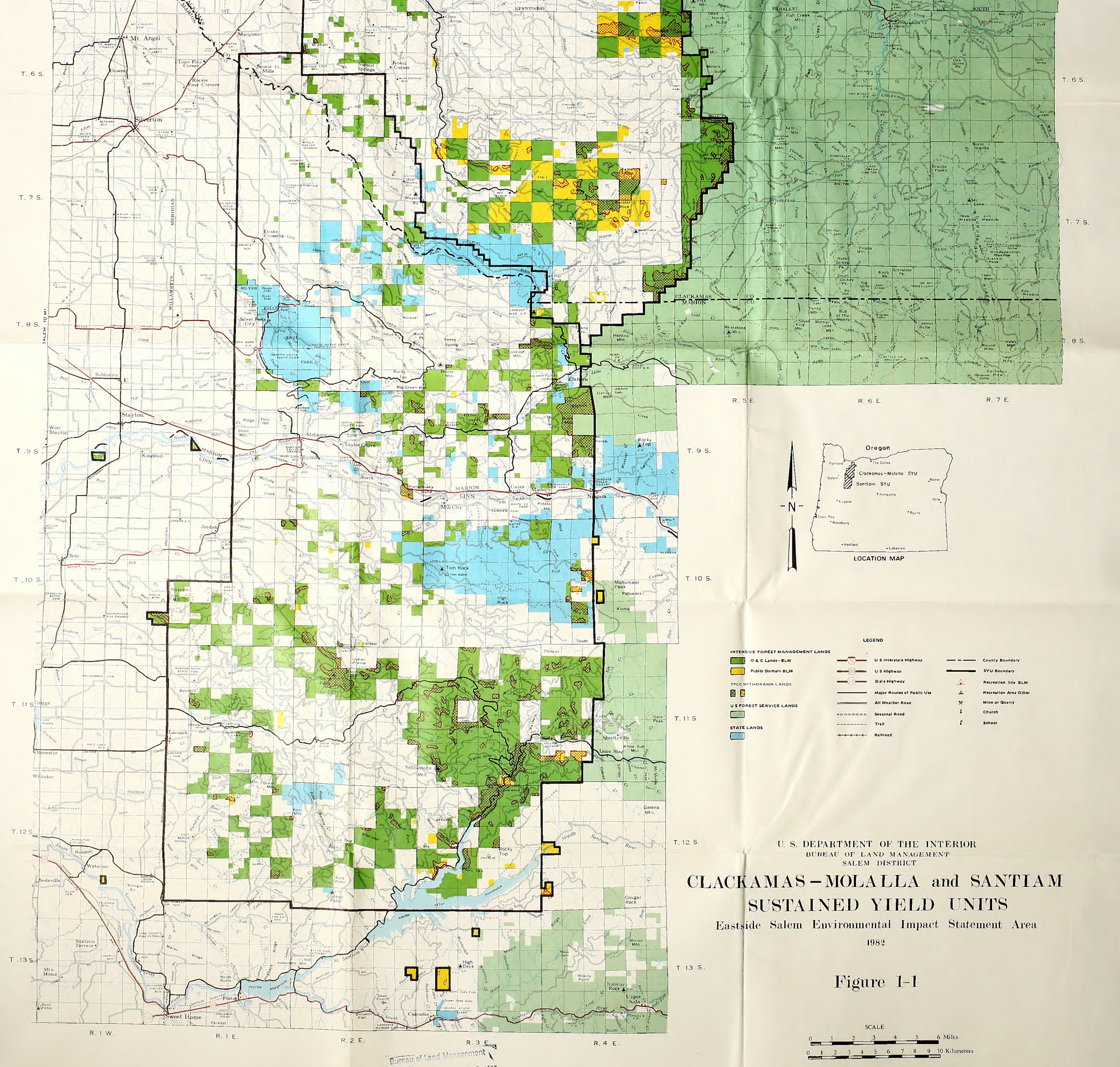

U. S. DEPARTMENT OF THE INTERIOR
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CLACKAMAS – MOLALLA and SANTIAM SUSTAINED YIELD UNITS

Eastside Salem Environmental Impact Statement Area

1982

Figure 1-1

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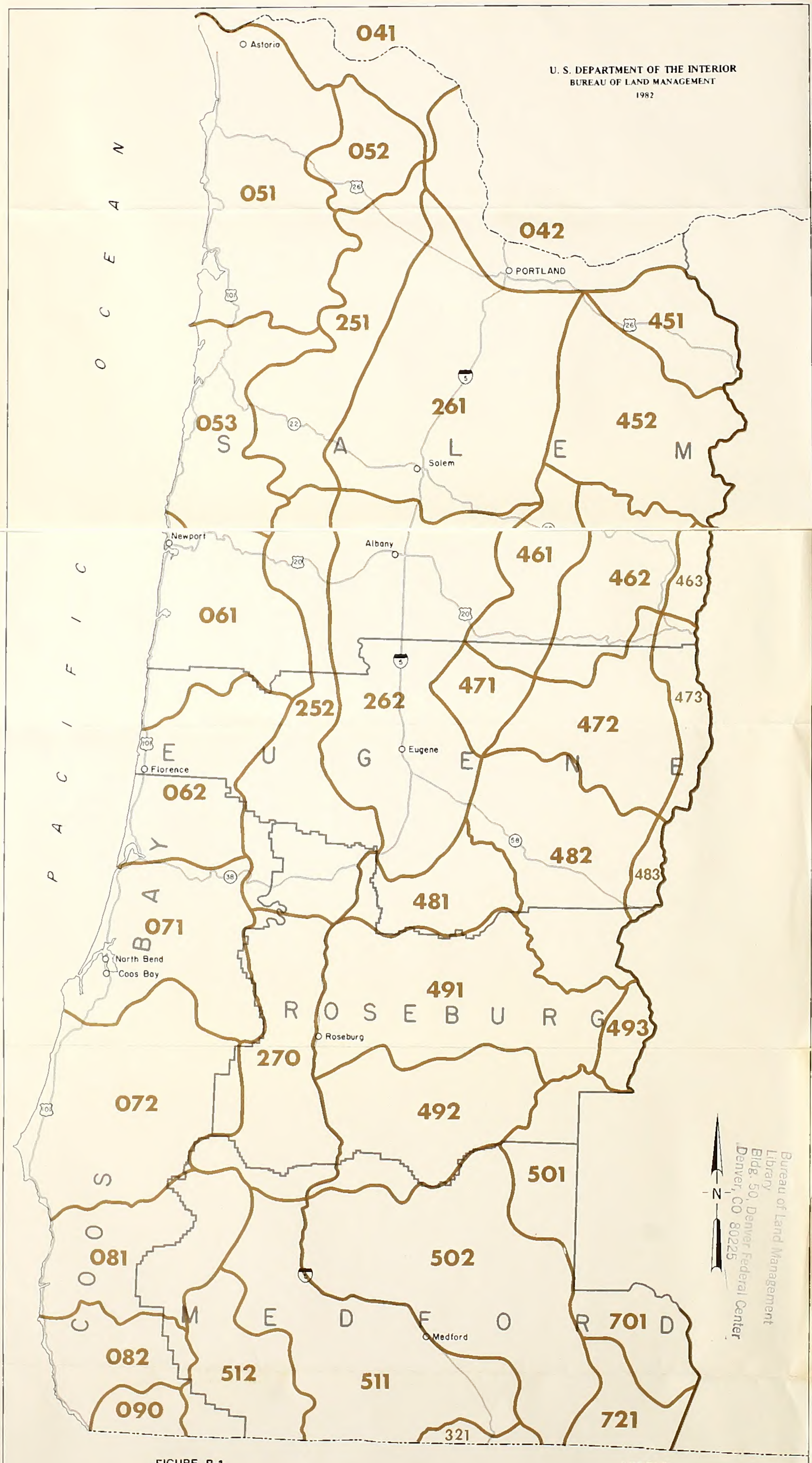

FIGURE P-1

WESTERN OREGON TREE SEED ZONES

Scale 1:1,000,000

LEGEND

261	Seed Zones Numbers
—	Seed Zones Boundary

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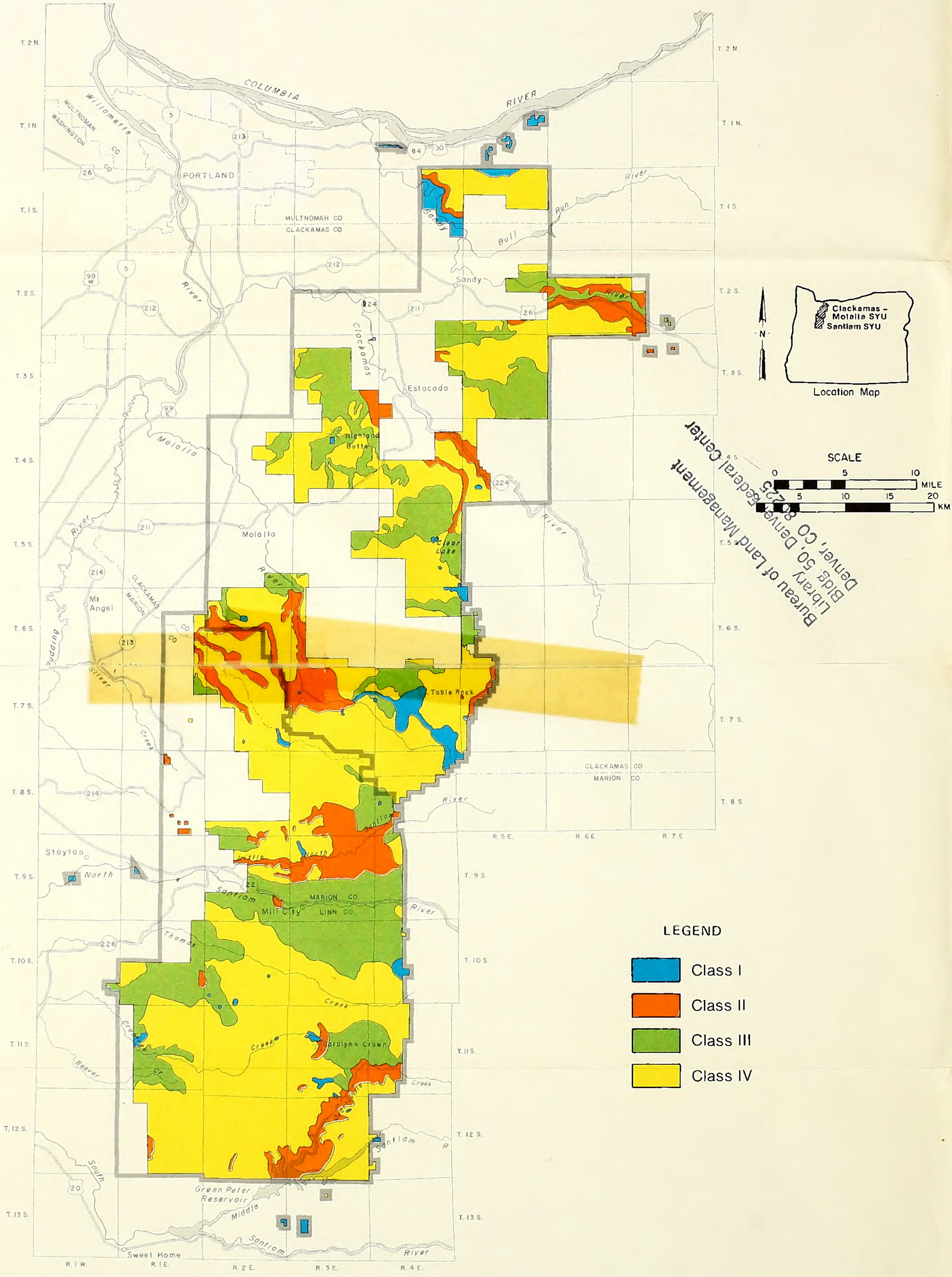

Bureau of Land Management
Library
Bldg. 50, Denver Federal Center
Denver, CO 80225

FIGURE 2-3

VISUAL RESOURCE
MANAGEMENT CLASSES

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SALEM DISTRICT

CLACKAMAS-MOLALLA and SANTIAM
SUSTAINED YIELD UNITS

Eastside Salem Enviromental Impact Statement Area
1982